August 1962

Agriculture

Vol. 69 No. 5

SELECTED CONTENTS

Published for the Ministry of Agriculture, Fisheries and Food by Her Majesty's Stationery Office

1s.
MONTHLY

ALL THAT CORN NEEDS

CCF No 1

Planning for a really good crop this winter? Then plan wisely with 'CCF' No. 1—ICI's most famous, proved and trusted compound. Its well-balanced plant food proportions of 12% nitrogen, 12% phosphate and 18% potash make it the ideal fertilizer to put in autumn seedbeds—to give you all the corn you plan for.

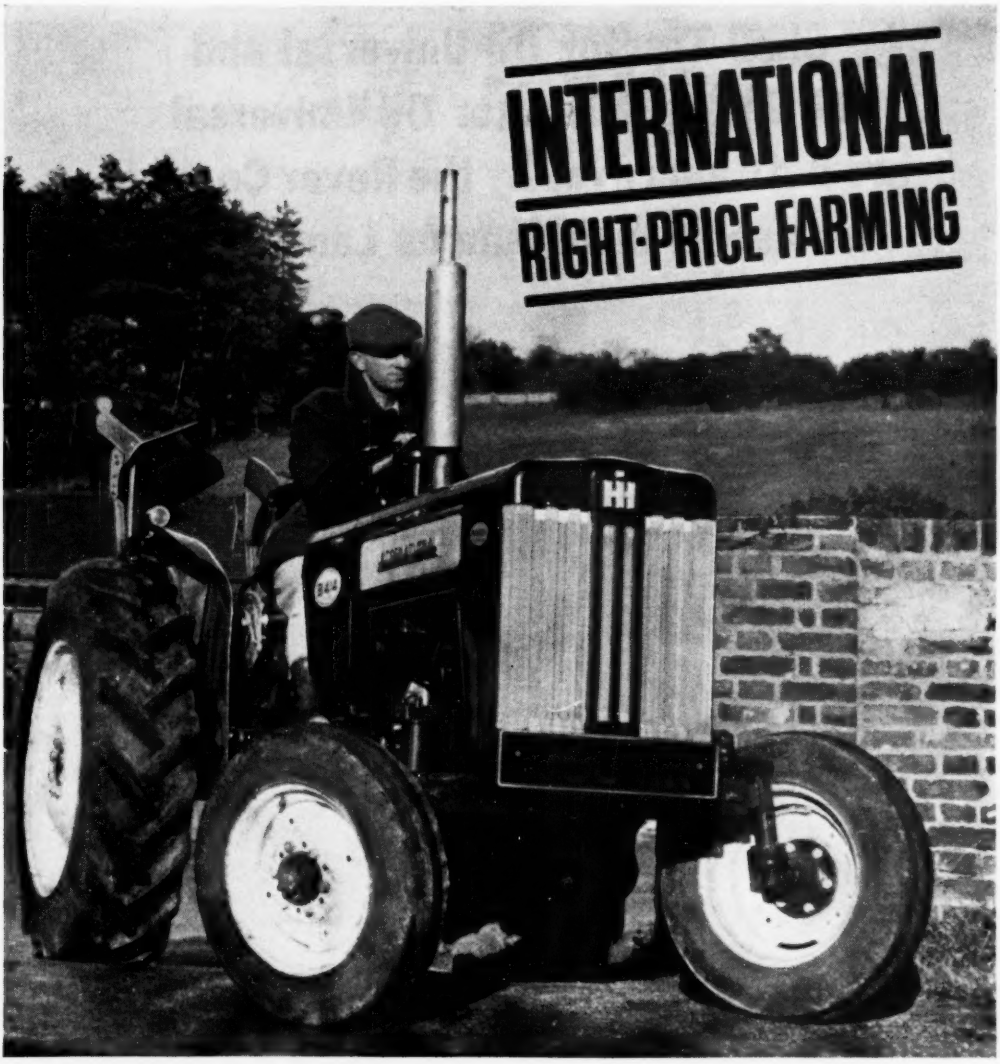
Profit by Early Delivery Rebates

Put your order in for 'CCF' No. 1 early—now if you can. This way you make a twofold profit. A saving on the cost of your No. 1 (and the sooner you take delivery, the bigger the rebate) and the best possible returns from your autumn-sown cereals. That's good business, sound planning—and it starts the moment you call your ICI agent.

ICI

NEW ICI NO. 3

If you are among the farmers who have a special preference for a low nitrogen compound ask for ICI No. 3. This new fertilizer contains more plant food than other low nitrogen, high phosphate and potash compounds. Actual proportions are 10.20.20—a total of 50 units.



THE TRACTOR WITH EVERYTHING FARMERS WANT MOST–THE B-414

McCormick International B-414—International's new benefit-packed, astonishingly low-cost 40 b.h.p. diesel. Right-Price features include: Vary Touch hydraulics · Diff-lock · Disc brakes · New 40 b.h.p. engine · Ten-speed gearbox Exclusive p.t.o. speed choice plus many, many more! B-414: an essential part of International Right-Price Farming!

SEE YOUR INTERNATIONAL HARVESTER DEALER NOW

INTERNATIONAL HARVESTER COMPANY OF GREAT BRITAIN LIMITED · HARVESTER HOUSE · 259 CITY ROAD · LONDON EC1

Please mention AGRICULTURE *when corresponding with Advertisers*

Agriculture

VOLUME 69 · NUMBER 5 · AUGUST 1962

Editorial Offices
Ministry of Agriculture, Fisheries and Food
Whitehall Place, London S.W.1. Trafalgar 7711

CONTENTS

BILSTON basic slag–

consistently high quality

Bilston excels because of its high grade, high citric solubility and fineness of grinding.

It's always high grade—16% to 17% P_2O_5; the citric soluble P_2O_5 is guaranteed to be only 1% less than the total. Thus 95% (and often more) of the phosphate it provides is citric soluble. And with a fineness of 85%, it works quickly and yields up more of its phosphate over the years. Bilston is the supreme low-cost phosphatic fertilizer.

"The story of Bilston basic slag and its uses" free from Wm. D. Carson, Chief Agricultural Adviser, Fisons Basic Slag Limited, Harvest House, Ipswich, Suffolk.

GRAIN on the FLOOR

UNLESS you are producing farm grain for seed, there is a lot to be said in favour of storing grain in bulk on the floor—not least it is very much cheaper than putting it in bins in a specially designed barn. But, although simpler, the same discipline is required in conditioning the crop as is necessary for any storage system. The grain must be dried to a moisture content consistent with the storage period.

Remember, it cannot be handled so readily as in a bin system, so the drier should be fully capable of coping with each day's intake, and no chances should be taken on moisture content. Where the intake rate is greater than the drier capacity, a holding bin to act as storage between pit and drier is a sensible addition to avoid double handling—the drier continuing to operate after harvesting has finished, thus giving a clear start for the following day. After drying, the grain is carried by elevated conveyors or portable augers to the storage floor, where it is allowed to pile up to the required depth.

Provided the grain has been properly dried, there is no limit to the depth to which it can be stored, except that imposed by the strength of the side walls to take lateral pressure from the grain. But as simplicity and reduced costs are the ends in view, it is doubtful whether it is economic to allow the grain to pile up against the walls to a depth

greater than 3 feet. At this depth 9-inch walls, simply reinforced, will suffice.

Floors must incorporate a damp-proof membrane, which may be a bituminous coating or a polythene sheet laid within or under the concrete. In some cases where the subsoil is unsuitable or poor load bearing, the concrete may have to be reinforced.

Loading-off is most readily done by a portable auger direct on to the collecting vehicle, and doors sufficiently wide and high should be constructed to allow vehicles to back right up to the grain face. Alternatively, an auger could convey the grain to a bagging-off point. Some additional labour will obviously be required in cleaning up the last remains from the floor, but what an advantage it is to have a large covered space available until next harvest.

Heavy or Lightweight Lambs?

The profitability of the lamb trade is examined by **P. G. JAMES**

MANY of the costs incurred in sheep production, particularly food, labour and medical charges, are fixed and can only be changed by a different system of production. But some of the costs can be reduced if the level of management is raised.

Farmers should give serious thought to the feeding policy of their lambs. There are two extreme ways of keeping fat lambs, both of which are profitable. One, high feed costs with correspondingly high receipts; the other, low feed costs but naturally low receipts. Either feeding policy should show a profit. What needs to be guarded against is the middle path—high costs with low receipts—a situation which arises when a producer somewhat half-heartedly feeds his lambs a moderate ration. As a guiding principle, every £100 spent on sheep feed should, with average management, produce £140 of output; with improved efficiency, an output of £165 should be achieved.

Improved grassland management means a higher stocking density, with a consequent reduction in the grazing cost per lb of output. Controlled grazing, with the lambs ahead of the ewes, avoids waste and reduces the total land requirements of the flock. By keeping 10 more ewes to every 100 acres of grass, the grazing charge is reduced by $\frac{1}{2}d.$ a lb of output.

A further economy in expenditure can be made by reducing the annual flock replacement charge. This is governed by two items—the purchase price of the ewes and their estimated average flock life. When buying ewes, flockmasters should always bear in mind the fact that the market price for ewes of all ages is an indication of the demand for, and the supply of ewes; it is not necessarily a measurement of their quality. A twelve guinea ewe is not automatically a better ewe than one that costs £10; high ewe prices are not a short cut to success in sheep production.

Generally, shearling ewes in early lambing flocks on lowland farms have an estimated flock life of five years; in late lambing flocks it is six years, and in folded flocks only four years. On mountain farms, the breeding ewe normally drops four lambs before she is culled. All too often, old ewes are culled from breeding flocks purely on the grounds of low prolificacy, although in many instances it would pay the flockmaster to keep them in the flock. Under current market conditions, if an old ewe can produce one lamb regularly, it is better to keep her than buy a shearling replacement.

Greater output

The keynote of successful sheep production, however, is a high lambing percentage. Although some economy of expenditure can often be achieved on the lines indicated above, it is nevertheless true that some three-quarters of the costs are unavoidable. Consequently, increased profitability must be secured through increased receipts, and this is most readily attained by selling more lambs.

It may seem paradoxical to advise farmers to increase production at the present time, when prices are tending to fall, and fears exist of a possible sheep cycle, but a higher output, resulting from an enhanced lambing percentage, decreases production costs per lb of output. A late lambing flock of 100 ewes, with a lambing percentage of 150, produces 6,750 lb of lamb a year (average selling weight, 45 lb e.d.c.w.) at a total cost of £870 or 2*s.* 7*d.* a lb. If the lambing percentage is increased to 165, total costs rise by £50 to £920, but the cost per lb of lamb sold is reduced to 2*s.* 5¾*d.*

Probably the most significant factor influencing the lambing percentage is the level of management attained by the flockmaster. This will govern not only the condition of the ewe at mating and lambing time, and hence the number of lambs born but, what is of more importance, the number of lambs weaned. A balanced ewe ration before lambing, and conscientious shepherding during and immediately after lambing, increases the number of lambs weaned and enhances the lambing percentage.

Finally, in the sphere of production, the importance of wool must be remembered. This is, in essence, a by-product of sheep production in Britain, obtained at no additional cost save that of shearing and carriage. Over the past few years, the wool receipt has all but covered the labour cost incurred in sheep production, and it must therefore be regarded as an important factor. With this in mind, future policy in Britain might well envisage the possibility of the dual-purpose ewe breed, in an attempt to increase the not-too-impressive wool yields at present being obtained.

Successful sheep management further implies overcoming two important marketing problems: selling lambs at that time when the relationship between costs and receipts is such as will secure the highest profit potential, and selling lambs at the optimum, economical weight.

Time of sale

It is often said that the mandate to sheep producers is for an 'early' lamb—that is, a lamb sold fat between mid-March and mid-April. This implies early lambing (January and early February) rather than March and April lambing. The late-lambing flock is appreciably more profitable than the early one—the difference between them is about £1 15*s.* a ewe. There are several reasons for this. First, the average flock life of ewes lambing in January and February is about five years, compared with six years for ewes lambing in March and April. Consequently, in a late-lambing flock, the flock replacement charge is reduced. A second reason is the heavier death rate among young lambs in the early flock. Indeed the difference may be as much as 20 per cent, which in a flock of 100 ewes means 8 cwt of lamb less a year. Again, the costs of production of early lambs (particularly for food and labour) are higher, due to shortage of grass in January and February and the resultant need to hand-feed the lambs. January lambs require concentrated hand-feeding from birth to weaning, especially if they are to make the early market, but lambs born in

When to sell? Dorset Horn lambs come under the appraising eye of the flockmaster

late March and early April 'grow with the grass' without hand-feeding of concentrates. Early lambing also lasts longer and costs more in labour.

But it is the seasonal variation of prices which is the main reason for the greater attractiveness of the late-lambing flock under present market conditions. The peak period of fat lamb prices is confined to a few weeks from mid-March to mid-April; thereafter, prices fall substantially and after June are fairly constant. Thus, unless the farmer can sell most of his lambs by mid-April, the price is not high enough to offset the heavy cost of early lambing. In practice, January and February lambing does not produce enough fat lambs for the early April markets. Even in early lambing flocks, sales rarely begin before the end of March—and farmers are fortunate if they can market 25 per cent of their lambs before the end of April.

Indeed, in view of the limited demand for early lambs, it is doubtful whether farmers should try to market more than a quarter of their lambs by the end of April. The market seems prepared to pay a high price for a few early lambs, but a small increase in supply causes a sharp decline in prices. This is probably the reason why Dorset Horn flocks are not more common at present. October lambing is less arduous than January and February lambing, lamb losses are lower, and most, if not all, the lambs will be ready for the March and early April markets. But if, as seems likely, the demand at high prices is limited, an increase in supply during these weeks will depress market prices, and the anticipated advantage of very early lambing will be lost.

The selling weight

It is often assumed that the lightweight lamb must be more profitable than the heavy lamb. The current demand is for a small joint and, in consequence, the light lamb realizes a higher price per pound. Even so, at present prices the profit margin is in favour of the heavy lamb by about 8*s*. a ewe. Two reasons seem to account for this: first, the difference in market prices offered for the two weight ranges and second, the deficiency payment received by the fat lamb producers.

It is true that the market places a premium on lightweight lambs (up to 45 lb e.d.c.w.), but the difference is less than is often realized. The producer is more concerned with the return per lamb than the price per pound. Compare, for example, a 45 lb unshorn fat lamb sold in the last week in July 1961 at 24½*d.* a lb and a 50 lb lamb sold at the same time at 23*d.* a pound.* The lightweight lamb made £4 11*s.* 10*d.*; the heavy lamb £4 15*s.* 10*d.*—a difference of 4*s.* In a flock of 100 breeding ewes with a lambing percentage of 150, this is equivalent to a difference of £30. A similar comparison made in July 1960 revealed a difference of 8*s.* a lamb, or £60 for the whole flock. For this reason, the market price difference between light and heavy lambs is hardly sufficient to encourage the sale of light lambs.

This, however, is not the total return per lamb received by the producer. In addition, he can anticipate a deficiency payment based on the relationship between the average market price for fat lambs and the guaranteed price. Under the present deficiency payment scheme for fat lambs, a uniform payment per pound is made irrespective of weight, provided the deadweight does not exceed 50 lb. Thus a 50 lb fat lamb qualifies for the same guarantee per lb as a 40 lb fat lamb. The implication of this is evident from a consideration of the total returns per lamb received by selling a 45 lb lamb in the last week in September 1961, and a 50 lb lamb in the last week of November 1961. The 45 lb lamb sold at 20¼*d.* a lb; the 50 lb lamb at 25*d.* a lb. In addition, the respective guarantee payments were 19¼*d.* a lb and 14¾*d.* a lb. The total receipts obtained from the two transactions were:

	45 lb lamb (sold in Sept.)	50 lb lamb (sold in Nov.)
	£ *s.* *d.*	£ *s.* *d.*
Market price	3 15 11	5 4 2
Deficiency payment	3 12 2	3 1 6
	7 8 1	8 5 8

The heavier lamb, sold two months later, realized over 17*s.* more than the light lamb. This represents £130 in a breeding flock of 100 ewes producing 150 lambs.

The market price difference alone favours the heavier lamb; the effect of the deficiency payment is to make the heavier lamb even more profitable.

To sum up, high profits from sheep production depend upon the following factors. The system of production, which should be the one which can be imposed most readily and most easily upon the existing farm organization; the number of lambs marketed and the flock life of the ewes; the feeding policy of both the ewes and the lambs; the time of marketing and the selling weight of the lambs. Whichever system of sheep production is adopted, the optimum return will not be achieved if these factors are ignored.

*These and the subsequent prices, were the average auction market prices received by producers for light and heavy lambs respectively, as given in the M.A.F.F. Agricultural Market Reports.

On Mr. John Collinson's North Riding farm special attention is given to what goes into the dairy herd in relation to what comes out

Cheaper Milk by Feed Control

L. V. R. Bishop

It can be reckoned that over half the costs of running a dairy herd is chargeable to feeding. The tighter the control therefore in this department of farm management, the higher should be the profit margin. Mr. John Collinson's 250-acre farm at Whitby Laithes, on the north coast of Yorkshire, provides a good example of this kind. Mr. Collinson took part in the 1960–61 Milk Costs Survey, undertaken by the University of Leeds Agricultural Economics Department, and this showed that the average food costs per gallon of the 45 herds in the survey was 55 per cent of the total production costs. For Whitby Laithes it was 53 per cent of the total production costs of the farm, but in terms of cash this was only 38 per cent of the average.

TABLE 1

Milk costs (per gallon) 1960–61

	Average 45 herds per cent	Whitby Laithes Farm Per cent average	Per cent total costs
Purchased food	31	14·5	20·5
Home-grown food	16	15·5	21·5
Grazing	8	8	11
TOTAL FEED	55	38	53
Labour	23	10	14
Misc. and Depr.	22	23	33
TOTAL COSTS	100	71	100

The cropping averages 90 acres of wheat and barley, 10 acres of kale and 150 acres of grass. The stocking is a Friesian dairy herd which numbered 60 for 1961–62, with 67 other cattle, giving an average of 1·7 acres per cow used for the dairy herd.

Overcoming late grass

One of the difficulties on this north-east coast is the natural lateness of growth of spring grass, due to the prevailing cold winds. To overcome this as much as possible, the inclusion of some 20 acres of S.22 Italian ryegrass in the grass acreage is regular policy, 10 acres being sown down each season. Seeding is done in April, following the kale; 40 lb per acre S.22 is sown, this amount being divided and sown 20 lb each way with a grass seed drill. The cows are normally strip grazing the ryegrass by 25th March. The long leys are chiefly timothy meadow fescue.

Fertilizer usage is designed to give the maximum economic output. The leys for silage get 3 cwt C.C.F. (12:12:18:) plus 3 cwt Nitro-Chalk 21 per acre, the Italian ryegrass gets 5 cwt basic slag (medium grade) plus 3 cwt Nitro-Chalk 21 and a further 2 cwt Nitro-Chalk 21 after each grazing.

Summer grazing

In 1960–61 44 per cent of the total output of milk was produced in the summer and 56 per cent in the winter. The summer feeding was obtained largely from grazing. Only 0·8 lb of concentrates was fed for each gallon of milk produced, whereas the average for the University of Leeds Survey was 2·2 lb of concentrates for the same period. A strict watch on the feeding of concentrates during these months when the grass should be pulling its weight has given its reward, and indicates the importance of the right use of what has been grown.

While on the subject of grazing, mention may be made of the kale, which is utilized by strip grazing. Both marrowstem and thousandhead are grown, and the grazing period is from November to mid-January. The crop provides a succulent green winter food, at 50–60 lb per cow daily. It saves on the consumption of conserved material for a third of the winter period at an approximate equal cost per cwt S.E. with silage and a greater weight per acre.

Move to self-feed silage

The north-east coast of Yorkshire is noted for its sea mists, or 'fret', which those farming there have to reckon with in a normal spring or summer. The average rainfall is not high (25·2 in.), but the atmosphere has often a quality of dampness which is a matter of concern when the question of hay or silage has to be faced in deciding a conservation policy.

For the past fifteen years, Mr. Collinson and his father before him have been enthusiastic about the value of silage for milk production, and until 1957 they made it in the conventional concrete-lined pit silos. At that time Mr. Collinson began to question whether his policy of milking 55 cows in a normal double-stalled cowshed and handling silage from the pits was not becoming outdated as costs tended to rise and milk prices tended to fall.

He made it his business to visit a large number of farms, both in and out of the county, where self-feeding of silage and parlour milking were being practised; then to consider in detail how these practices with their varied layouts could be adopted on his own farm, and their probable effect on the economics of his milk production.

The result was that in 1958 he took the plunge. The cowshed was gutted and turned into a foldyard, a milking parlour of three stalls in tandem was

Some of the Whitby Laithes herd, young cattle in the background

nstalled (later increased to six stalls), part of an existing yard was covered in and became the collecting pen; a second Dutch barn was erected close to an existing one of equal size, the two being capable of holding some 600 tons of forage-harvested silage.

This self-feeding system has now been operating for four winters, and although it had its inevitable teething troubles, Mr. Collinson has no regrets in having taken this bold step in an area where the system was hitherto unpractised. For the future he is interesting himself in the possibilities of adopting wilting, particularly as a means of reducing seepage.

Winter feeding

The silage feeding is controlled by the common but highly satisfactory use of an electric fencer, and at a public feeding demonstration organized by the N.A.A.S. on the farm in December, 1961, visitors commented on the excellent feeding face which was being maintained. In 1961 the first cut of silage from 70 acres of leys produced 600 tons of silage, and the calculated cost per ton was £1 5*s.* 7*d.*, or 14*s.* 6*d.* per cwt S.E. No hay is made, and silage is fed to calves from 4 weeks old.

Barley is grown instead of oats, as a better source of energy. A large proportion of barley in included in the dairy rations, all of which are home mixed. The rations, carefully thought out, are fed on the lines shown in Table on p. 213.

As there is no hay in the diet to act as a source of vitamin D, Mr. Collinson favours the injection of the cows with vitamin D rather than including a special supplement in the feed.

The average winter concentrate feeding for 1960–61 was 4·7 lb per gallon (giving a yearly average of 3 lb per gallon), the Leeds Survey averages being 4·1 lb and 3·1 lb respectively. In view of the results achieved, this figure is considered very satisfactory, especially bearing in mind the proportion of home-grown cereals in this amount. It certainly pays to use concentrates, says Mr. Collinson, provided they are carefully fed; the all-important thing is to have control over the feeding to avoid waste. To know how much the cow is getting is as essential as knowing how much she is giving if an estimate of

TABLE 2

Food needed for maintenance plus (lb)

Early winter	*1 gal*	*2 gal*	*3 gal*	*4 gal*	*5 gal*	*6 gal*
Kale	60	60	60	60	60	60
Silage	40	40	40	40	40	40
Cereal mix	—	5	9	13	17	9
Dairy mix	—	—	—	—	—	8
Late winter	*1 gal*	*2 gal*	*3 gal*	*4 gal*	*5 gal*	*6 gal*
Silage	100	100	100	100	100	100
Cereal mix	2	8	12	16	12	—
Dairy mix	—	—	—	—	4	16

Cereal Mix	*Dairy Mix*	
	Kale feeding	*All-silage feeding*
6 cwt barley (rolled) 1cwt flaked maize plus minerals	4 cwt barley (rolled) 1 cwt high protein cake (37%) 1 cwt flaked maize plus minerals	5 cwt barley (rolled) 1cwt high protein cake (37%) 1 cwt flaked maize 2 stones fish meal plus minerals

margin over costs is to be arrived at, and the margin is what the farmer is in business for.

Yields

The average yield for 1960–61 was 1,080 gallons for 56 cows and heifers. It should be noted that there were twenty first-calf heifers that year, but this was due to the strict culling policy, the culls being mainly younger animals.

Among the herd is one animal aged 13 years and in her tenth lactation: she has given 2,000 gallons in a lactation on self-feed. There are also eight cows which have given 1,500 gallons and over, and nine cows which have given between 1,400 and 1,500 gallons. These yields have been obtained with milking twice a day, and the herd average milk quality figures are BF 3·88, SNF 8·72.

The results obtained at this farm show that given the right herd and the right management, a self-feed system can be suitable for the production of high yields.

Hawsker Ruby 5th, 13 year old, has given 153,891 lb in 10 lactations, including 2,000 gallons on self-feed silage

Labour and buildings

The organization of the labour and buildings layout are outside the scope of this article, but are nevertheless important points in the system of milk production at Whitby Laithes. It is sufficient to refer to the low labour cost shown in Table 1 on p. 210, which in practice means one person engaged in each milking. Two men were needed under the original cowshed system.

Mr. L. V. R. Bishop, N.D.A., is the N.A.A.S. District Advisory Officer for the Whitby district of Yorkshire (N.R.). Son of a Wiltshire farmer, he is a Silver Medallist of the Royal Agricultural College. He wishes to thank Mr. W. Harwood Long, of Leeds University, for permission to use data from the Milk Costs Survey, 1960-61.

Tamar Valley Strawberries

D. J. FULLER

Supreme companions to cream, strawberries are an important crop in this fertile valley on the borders of Devon and Cornwall

---

HORTICULTURE in the Tamar Valley was originally founded on the production of fruit, with considerable areas of apple, cherry and plum orchards besides all types of soft fruits. Situated on the border between Cornwall and Devon, the sheltered valley, with its mild, humid climate, has many small horticultural holdings. It is essential to set early crops if the area, so far from main markets, is to be prosperous. As many gardens as possible are situated on the steep, south-facing slopes to obtain the maximum benefit from spring sunshine. Strawberries were first sent to Covent Garden market from the village of St. Dominic during the 1860s, and the district has been noted for its early fruit ever since.

Between 1880 and 1910 strawberry growing expanded rapidly but by the 1920s, when Royal Sovereign was the most popular variety, eelworm and

virus diseases had seriously reduced cropping. By 1939 improved stocks of plants had made some improvement but unfortunately the root rot fungus, Red Core, was introduced into the district by infected plants and, following a series of wet winters, the infection reached epidemic proportions during the late 1940s. The spread of the disease was accelerated by the interchange of plants between holdings and was partly due to the fact that, by then, at least 80 per cent of the plants being grown were of the very susceptible varieties Madame Lefebvre and Huxley Giant. The extent of the problem can be judged by the fact that over one hundred holdings were scheduled as infected under the Red Core Disease of Strawberries Order.

Post-war prosperity

Immediately after the war flower growing was extremely profitable and, because of the disease problems associated with the strawberries, many holdings turned over almost entirely to daffodils, irises and anemones. Trials at Ellbridge Experimental Station with the newly released Cambridge and Auchincruive strawberry varieties led ultimately to the selection of Cambridge Prizewinner as the most suitable variety resistant to Red Core. Although little used in other parts of the country, this has been the most popular variety in the Valley for the past 7–8 years.

A serious slump in flower prices from 1954 onwards brought renewed interest in strawberry growing to the Tamar Valley. New varieties quickly replaced Madame Lefebvre. The difficulties of controlling narcissus bulb eelworm on intensively cropped land, and the need for a long rotation to combat anemone Downy Mildew, have since combined to restore strawberries to a place of importance in the cropping programme. Today there are 300–350 acres of strawberries in the immediate Valley area and, with the first fruits ripening at the end of May, they have been the most steady source of income in recent years.

Varieties

During the past eight years seventeen new varieties have been tried at Ellbridge, but very few of them have proved to be suitable under the climate of the district. Provided Red Core disease does not show up, it is unlikely that any of them will replace those already being grown.

Although not a heavy cropper, Cambridge Prizewinner is extremely popular, due to its earliness and the fact that its sparse leaf habit permits quick drying. Thus the fruit is less likely to rot in wet weather. It is bright in appearance and travels well, so it is readily accepted on the markets. As it accounts for 70 per cent of the acreage, it is most unfortunate that on some holdings it is beginning to go down with Red Core.

Cambridge Favourite is of less importance, since it matures slightly later and its denser leaf habit makes it more susceptible to *Botrytis* in wet weather. It is popular on some of the steeper holdings where the later fruits of Prizewinner often fail to develop properly in dry weather.

Cambridge Vigour has had a mixed reception. It is acknowledged as being a good cropper of high quality fruit, but it is far too susceptible to *Botrytis* in the humid conditions of the Valley. Only limited areas are being grown, but some people like it because it often produces a partial second crop at a time when prices are relatively high.

Strawberry gardens at Calstock, in the Tamar Valley

Of the later varieties, Talisman has almost completely ousted Cambridge Rearguard, because of its superior fruit quality. In trials, Redgauntlet has been only slightly earlier than Talisman, but it has given a far heavier crop and it is very attractive to those growers with an outlet for late fruit.

Many other varieties can be seen in small lots, but to find plantations of those types which were the backbone of the industry until 10–12 years ago is now virtually impossible.

Cloches are not being used to any great extent on the early holdings. They are too difficult to handle on the slopes, but a few growers have them and usually manage to pick their first fruits during the last days of April. Cambridge Forerunner (54) was the most popular variety for this purpose, but as the stock deteriorated its place was taken by Cambridge Favourite and Cambridge Vigour.

The normal strawberry season ends just as the local demand is stimulated by holiday-makers, and many growers have always been interested in late varieties. The perpetual fruiting varieties were tried at Ellbridge but, although good stocks were built up by careful selection and roguing, they did not prove to be commercially worth while because the beds had to be picked over frequently for relatively small quantities of fruit.

Cold storage for strawberry runners opened up new opportunities for out-of-season production, and preliminary trials were made during 1960 with runners taken from store for planting during May and fruiting during August. Although these first trials were not entirely successful, the method has distinct possibilities and more detailed experiments are in progress.

Pests and diseases under humid conditions

As in all strawberry-growing districts, aphids are troublesome. The mild West Country winters allow them to build up quickly in the spring. Early spraying is usually essential to control this pest, and most growers have

welcomed the newer insecticides such as malathion, demeton-methyl and dimethoate, in place of the HETP and schradan which they were using a few years ago. During the 1954 and 1955 seasons strawberry blossom weevil caused serious damage and, as Cambridge Prizewinner appears to be especially susceptible, many growers now regard an application of DDT as a necessary routine.

Of the diseases, Red Core is, of course, of prime importance, and there is a constant search for new early varieties which are resistant to it. All virus diseases are important in an area of intensive smallholdings, and they have inflicted serious damage to the strawberries in recent years. The position is improving, however, with the introduction of virus-free plants and the greater use of insecticides to control the aphids. Green petal virus has given more trouble than in many other strawberry-growing areas, particularly on some plantations of Cambridge Favourite and Talisman. The discovery of the soil-borne arabis mosaic virus in the area has given some concern, but undoubtedly it has been present in some places for many years. It must, of course, be carefully investigated but it is not, as yet, a serious threat.

Botrytis can be extremely serious, and a high proportion of the fruit is lost in a wet year. Captan can give a very effective control, but it is rather expensive and unfortunately has to be applied early, before it is known whether weather conditions will warrant its use. The climate in the Valley favours this disease and, as chemical control is always likely to be difficult, the general opinion is that the breeding of more varieties which have a sparse leaf habit and are thus less susceptible, is the best answer.

Culture

Strawberry beds are kept down longer than is normal in other areas. This is because of the difficulties of ploughing on the slopes. So far there has been little interest in the system, used in Cheddar, of annual replanting with a high number of plants to the acre because, with intensive cropping, few have sufficient land for runner production and the cost of early runners each year is prohibitive. There is little doubt that many growers are spending too much on fertilizers and expensive 'organic' manures; a study of local soil analysis reports indicates that much of the money would be better spent on buying farmyard manure to restore the amount of organic matter in the soil. Generally, growers agree that most of the land has enough phosphates, but many are still applying too much nitrogen; on the shallow soils strawberry plants always used to be rather small, and the tendency is to give the new virus-free plants the same amount of nitrogen as was given to the old virus-infected stocks of Madame Lefebvre.

Under the high rainfall conditions of the south-west, the herbicide 2, 4-DES is quite effective for the control of annual weeds among strawberries. Provided the land is well cleaned just before the chemical is applied and the soil has been given time to warm up in the spring, weed control will last for several weeks. Even in the wet summer of 1960, beds on the Experimental Station were kept clean until the winter by two applications—one in May and one in August, with a hoeing between the two doses. Unfortunately, annual meadow grass is the first weed to appear after this treatment, and as the mild winters enable it to continue growing, it can become troublesome on treated land. So far trials with other herbicides have failed to give a satisfactory answer to this problem. A chemical for use in the autumn would be very useful.

Marketing

Market containers have changed a great deal during the past ten years. For many years the 2-lb chip was the standard container, but this has now given way to punnets and is seldom used except for the low-quality fruit at the end of the season when prices are low. Half-pound veneer punnets are probably the most popular but recently there has been an increase in the use of cardboard punnets. These seem to be quite satisfactory when used with the right type of punnet carrier. After much experimentation it has been found that, even for veneer punnets, three-layer crates are too cumbersome and liable to damage, but some excellent types of double and single-layer crates and carriers are now being made locally.

Fruit from the Valley is sent mainly to the Midlands and North; some even goes as far as Scotland. South Wales also takes a proportion of the crop, but most growers, even though they use London for flowers, think it a poor market for their fruit. With the rising cost of transport, many growers have been trying to develop the local market and they are now succeeding in disposing of more produce in Plymouth.

Recent economic trends have made it increasingly difficult for the small growers to maintain their income, and already a number have given up the small, inconvenient pieces of land which were brought into cultivation during the second world war. The once highly valued very steep land has now become a liability, due to the high cost of cultivations. Some of it has been abandoned, but there has been some compensating development on flatter land which still has climatic advantages over much of the rest of the country.

The growers that have kept abreast of modern developments and have adjusted their cropping programmes to meet the changing economic conditions are still making a reasonable profit, and there is no doubt that Tamar Valley strawberries will be marketed for many years to come.

Mr. D. J. Fuller, B.Sc., N.D.H., who has recently taken the post of County N.A.A.S. Horticulture Officer in Cheshire, was previously responsible for horticultural advisory work in East Cornwall (including the Cornish part of the Tamar Valley) and supervision of the Ellbridge Experimental Sub-station, Saltash.

Business Partners

N. D. O. Capper *points to the advantage of Farm Machinery Syndicates as they have been developed in Herefordshire*

WHEN A. R. L. Aylward of Hampshire first talked to me about his idea for forming farm machinery syndicates, my reaction was fairly negative. I thought of all the reasons why they could not possibly work in Herefordshire: our climate was different, our farmer's wouldn't co-operate as Aylward's neighbours did in Hampshire, and so on. That was five or six years ago. Now we have 37 syndicates in Herefordshire, involving capital of nearly £80,000.

What happened, of course, was that Aylward, two years and several syndicates later, had another go at me, and the penny dropped. The penny that dropped then, has since saved me, and my syndicate neighbours, very many pounds. Since Aylward's first experiment in 1955, syndicates have progressed in Herefordshire in much the same way as they did in Hampshire. First of all, there were a few pioneer groups; then one or two more started up in the following two or three years. As the results became more widely known—results in terms of substantial savings in capital and costs—they caught on. We formed four syndicates in 1958, one in 1959, three in 1960, and twenty-one in 1961. So far this year eight more have been formed.

Strictly business

What *is* a farm machinery syndicate? It is a strict business relationship between a small group of farmers, based on clearly defined written rules governing the co-operative purchase and use of the best possible machine for the job. The strict business basis is important. There is no loophole for argument. As a result, most syndicates have turned business partners into friends and neighbours.

Advice on the setting up of machinery syndicates can be obtained in England from the Agricultural Central Co-operative Association, Ltd., Agriculture House, Knightsbridge, London, S.W.1, and in Wales from the Welsh Agricultural Organisation Society, Ltd., Brynawel, P.O. Box No. 8 Aberystwyth, Cardiganshire. However, there is now a well-established pattern for launching machinery syndicates. First of all, a county credit company—in our case Herefordshire Syndicate Credits, Ltd.—is formed through the county branch of the N.F.U., usually with the county N.F.U. secretary handling the

secretarial work. The directors are appointed by the county branch. The company has no share capital and is limited by guarantee. It has two main jobs: first, to assist in the formation of syndicates; second, to consider applications for loans from syndicates, and to finance those which are approved by borrowing from the lending bank.

Through the company, a syndicate can borrow up to 80 per cent of the purchase price for a period up to four years for mobile machinery, and five years for fixed equipment. The syndicate borrows at 1½ per cent above the bank rate, on the security of the several and joint guarantees of its members. Interest is paid on a reducing balance. Every syndicate must adopt model rules, as well as working rules covering such matters as the rotation and length of use of the machine by each member, the proportion of the loan that each member must pay, and so on. One of the most important rules ensures that the machine is inspected by an expert twice a year, and that copies of his report are sent to the company as well as to the members of the syndicate.

Costs and capital saved

Our syndicates began when—after Aylward had convinced me—I telephoned five of my neighbours and suggested we might share a combine or baler, and perhaps a weed sprayer. We held a meeting in my house, and invited along Mr. H. Richards, the county A.E.C. machinery officer, and Mr. George Johnson, our county N.F.U. secretary. We decided to form three syndicates. We have never looked back. Five of us shared an 8 ft combine which cut 800 acres in three years, before we sold it in part exchange for a 12 ft. Costs worked out at 37*s.* an acre, including depreciation. Three of us shared a baler, which baled over 60,000 bales in two years at under 3*d.* a bale, including string, depreciation and every other cost. We then sold that, too, in part exchange. And here it is worth emphasizing that the pay-off for syndicate-standard maintenance comes when you sell or trade-in your machine. Syndicate machines have a reputation that commands a premium on re-sale.

Syndicates not only keep your operating costs down; they release capital for investment in other lines of production. Few of us in Herefordshire have big acreages of combine corn. A small farmer could not afford £1,500 for a combine, but he might well find £150 capital for a share in a machine that will combine his corn at rates no contractor could touch. A bigger man might well have the capital, but he would be a fool to tie it up in Herefordshire in a machine that would be no more than a status symbol. (How much capital do farmers throw away in keeping up with the Joneses?)

Syndicates, by the way, can consist of anything from two to twenty-four members. Working rules are made to fit the circumstances. For example, in our baler syndicate, which has been operating for four years among three farmers, the proportions of payment and of use are 7:10, 2:10 and 1:10. Rotation in the first year works alphabetically, and the first in the first year becomes last in the second, and so on. None of the three can keep the machine for more than one-fifth of his share if another needs it. One member garages the machine for £5 a year, and maintenance and minor repairs are carried out by his employee at the syndicate's expense. His time is charged at 6*s.* an hour from the time he leaves his employer's farm until he returns, and the tractor at 4*s.* 4½*d.* including fuel.

The written report on each machine is the basis upon which the syndicate decides the bonus to be given to the operator. (This is another minor, but important, point: one machine—one operator.) Our top bonus rates, for example, are £15 for a combine operator; £10 for a baler, and £50 for the operator of an all-the-year-round machine like an excavator. It works.

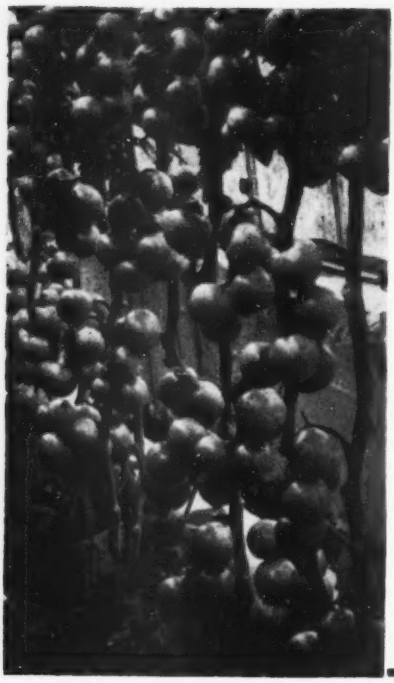
Gathering strength

There are now more than 220 farm machinery syndicates in Britain. The largest has 23 members and the smallest has 2. In terms of capital (£16,000 gross), the largest is probably our grain-drying and storage plant at Bodenham. This was the first syndicate building to receive a grant under the scheme providing help with the costs of certain buildings used by syndicates. It was built for bag and bulk storage of 600 tons, but after last harvest our 13 members (now 14) decided to increase bulk storage by another 600 tons, and install a processing plant. We are all small men, remember, as far as cereal production goes. (But none of us so small that we didn't notice the fact that our 25-ton bins of barley appreciated by £250 a bin last season, and kept our barley off the market last harvest.)

Our Herefordshire syndicates are today operating seven combine harvesters, three fertilizer spreaders, three hedge trimmers, two excavators, two rotavators, a baler, a beet cleaner/loader, a fertilizer and grain drill, a forage harvester and trailers, and a grain drying and storage plant. And let me emphasize two points. First, there has never been an appeal to the rules. This proves their success on the human level. Given a strictly business basis, the syndicate can be a highly successful form of co-operation. Second, even in the wet harvest of 1960, our combine syndicate operated without a hitch. Our five members combined 300 acres. The year before they combined 250, and then had time left over for contract work.

My own experience convinces me beyond doubt that the syndicate system of buying and operating machinery is a logical and effective method of keeping down our costs—and the Joneses!

The author of this article, **Mr. N. D. O. Capper, J.P.**, farms 800 acres in Herefordshire. His mixed system includes hops, currants, rearing of beef cattle, Clun sheep and cereals (mainly winter wheat).



Tomatoes are the cornerstone of Guernsey horticulture

Under Glass in Guernsey

D. J. Harrison

THE glasshouse industry of Guernsey as it is today originates from a very modest beginning in the mid-nineteenth century. The earliest commercial glasshouses were a development of lean-to structures erected in walled gardens by horticulturists in the latter part of the eighteenth and early nineteenth centuries. They were largely the work of shipwrights who turned their hands to glasshouse building when the demand for wooden ships declined.

Tomatoes instead of grapes

For many years grapes were the major crop, and their cultivation reached its peak in 1915, when 2,500 tons were exported. Tomatoes were first grown commercially in 1874. As the erection of glasshouses gained impetus and the cultivation of grapes fell off, tomato production rose from 10,634 tons in 1913 to 35,028 tons in 1939. At the present time something like 48,000 tons are shipped annually to Great Britain and Ireland.

The most recent figures available show that there are 1,150 acres of glasshouses on the island, of which 943 acres are heated and 207 unheated. Their operation is in the hands of some 3,000 growers, of whom well over three-quarters control nurseries of less than half an acre. A total of 861 glasshouse acres are devoted solely to tomatoes and 139 to tomatoes followed by flowers. The remaining 150 acres are given over to flowers and miscellaneous crops, including grapes and vegetables.

In spite of an increasing interest in the cultivation of flowers, most Guernseymen are convinced that tomato production will remain the cornerstone of the industry. Efforts are being made to ensure that production techniques and marketing methods are geared to such a standard of efficiency

that both present and future competition may be faced with confidence. With the same objective in mind, educational facilities for young horticulturists are being improved and developed, fruit grading and packaging has been improved, the system of fruit inspection has been streamlined and an intensive publicity campaign is being undertaken. Additionally, an experimental station is being completed to serve the particular needs of the island growers, and much closer contacts are now maintained, through the local Advisory Service, with the N.A.A.S. and various research and experimental stations.

Traditionally, tomato growing methods in Guernsey are thought to differ from those in Great Britain. In fact, such distinctions as exist are less pronounced than one might be led to believe and, as far as one can judge, at the present time, production techniques in Great Britain and Guernsey are running along converging lines.

Legacy from pioneer growers

Until fairly recently, however, there has been no close liaison between Island producers and those in the main tomato-growing areas of Great Britain. Consequently, Guernseymen devised their own methods and developed their own standards. That they subsequently attained such a high status is largely due to the efforts of a number of pioneer growers who spared no effort in disseminating the knowledge they had gained through hard experience and critical observation.

The success of this technique lay in the ability of the individual to interpret accurately the picture presented by the growing crop. Many growers developed this faculty to a very high degree; others, naturally, proved less adept. The modern approach, based increasingly on instrumental control linked with the knowledge gained from accumulated experimentation, is taking much of the guesswork from tomato growing.

The present generation of Guernsey growers has not been slow to grasp current trends, and to secure maximum advantage from them a good deal of redevelopment has taken place in recent years. This has included the erection of modern, light construction glasshouses, fitted with 24 × 24 in. panes giving maximum light transmission, and the installation of heating systems with thermostatic controls. There has been a large swing to automatic watering and liquid feeding.

Guernsey system of planting and training

Although marked differences in cultural methods are disappearing, the Guernsey industry is far from losing all its individuality. Several practices that have stood the test of time have been adopted profitably by British producers, amongst them the Guernsey system of planting and training. In this system the plants are set out in parallel rows along the glasshouse, one row on either side of the heating pipe. In a normal 30-ft wide glasshouse with six rows of heating pipes at six-foot intervals across the house, this allows for ten rows of plants (the two outermost rows of pipes serve only one row of plants each). Plants are trained to arch over the paths, at a height of approximately 6 ft, supported over parallel rows of wires running along the glasshouse from gable to gable. The system has much to commend it. Routine operations such as training, watering, picking, pest and disease control are all made easier. It may, however, encourage the disorder known as 'greenback'

in May and June, when fruit ripening over the arch is exposed to direct sunlight.

Glasshouse methods

The pattern of glasshouse development has also followed rather different lines to that in England. Although large estates exist, blocks of aeroplane-type glasshouses are rarely seen. Guernseymen have always favoured the individual vinery-type glasshouse, claiming that the improved light transmission and heating control obtained outweigh the disadvantages.

Discussion often centres around the Guernsey system of growing which uses hot pipes during the day, even in bright conditions, during March, April and May. There remains a considerable school of thought in Guernsey which insists that the maintenance of temperatures of 130–150°F in four-inch cast-iron pipes helps to swell and ripen fruit besides improving its quality. Where this system is employed, frequent and heavy overhead spraying is practised. Air temperatures are apt to rise very high and there is a considerable risk of running into poor fruit quality. Nevertheless the best exponents of the system continue to produce some 70 tons of quality fruit to the acre. Both pipe and air temperatures are reduced during spells of dull weather. Night temperatures differ little from normal, being maintained within the range of 58–63°F. The varieties grown under this system are generally moderately-vigorous to vigorous types such as Potential and Moneymaker.

'Strip' steaming

A further feature is the system of soil sterilization. Guernseymen rarely sterilize the entire floor area of their glasshouse. They prefer 'strip' steaming. Under this system a trench approximately 18 inches wide and 16 inches deep is sterilized on either side of each row of heating pipes. This leaves approximately 36 inches of unsterilized pathway between adjacent rows of plants.

Strip steaming in progress

Few growers own steam boilers, and these are generally contracted out by a number of firms. A memorable feature of Island life is to see, or hear, the massive locomotive-type tubular steel boilers rumbling through the narrow streets during October and November. Throughout the steaming period the glow from scores of boiler furnaces may, at night, be seen from almost any vantage point. The practice of 'strip' steaming considerably reduces the cost of soil sterilization and produces generally good results on all except light sandy soils, where early root-knot eelworm reinfestation from the pathways may quickly follow 'strip' steaming. It is debatable whether or not the method adequately controls soil-borne virus disease.

Early season tomatoes

Today it is probably in the field of early season production that the Guernseyman excels. Up to the present little or no experimental work has been directed specifically at early crop production, and firm recommendations are consequently unavailable. A select group of Guernsey growers, using methods which they have developed over the years, have become proficient at this form of production.

Sown from early to mid-November and pricked out into 4¼-inch cardboard pots containing generally J.I.P. 1½, the plants are grown along gradually at day temperatures of 56–60°F (or up to 65°F in bright conditions) and at night temperatures of 53–58°F (depending very closely upon the light conditions during the day). Water is given sparingly and high potash liquid feeding is employed. During propagation every care is given to ensure adequate spacing on the benches. Planting takes place when the first flower on the first truss is beginning to reflex.

After planting out, the temperature in the 4-inch cast-iron heating pipes is kept at approximately 100°F and ventilation is kept down, except in sunny mild conditions. Air temperatures range from 56 to 60°F at night and from 60 to 70°F during the day. In the event of a dull spell—which is not infrequent in early February—night temperatures may be dropped below 56°F to avoid flower abortion.

Root restriction

Planting is generally into 9-inch cardboard pots and after ball-watering water is very sparingly applied—at least until fruit is set upon the first and second trusses. The cardboard pots are stood upon polythene strips or squares of a suitable material to restrict root growth. With vigorous varieties, this practice may be continued until fruit is set on four trusses.

It should be understood that frequent watering will be required towards the end of this period. Once root restriction ends, and the polythene has been removed, the soil beneath the pots is well watered to ensure that free rooting takes place. During the latter part of February and March pipe temperatures are increased during the day to 120–140°F and ventilation is also increased. Air temperatures range from 70 to 75°F. At night sufficient heat is given to maintain 58–63°F.

Shading is given towards the end of March or early in April, and pipe temperatures are generally reduced to maintain air temperatures of about 75°F. At the beginning of June boiler fires are extinguished. In the opinion of many, if not all, of these growers, watering is of prime importance in early

production, surpassing even considerations such as nutrition and temperature (as long as the latter is not excessively high or low!).

The main varieties grown for very early production are Potential and Potentate. For later work the same varieties, together with others such as Moneymaker and Growers Pride are chosen, while for mid-December sowings similar varieties, along with a number of the new Glasshouse Crop Research Institute varieties are popular. Neither Ware Cross nor Ailsa Craig is widely grown.

The growers themselves

While it has been possible to touch only briefly on a few aspects of the growing industry, the picture would be even less complete without some reference to the growers themselves. As a body they are extremely industrious. They are inclined to be individualistic, preferring to retain their independence rather than to operate collectively. They are, nevertheless, loyal to a well-managed growers' organization, which has accomplished much towards reconciling the views of individuals to the best interests of the growers as a whole. They may be inherently suspicious of new ideas, but they will quickly adopt new methods if these are shown convincingly to be better than the old.

D. J. Harrison, B.Sc., Dip. Hort., has recently returned from Guernsey, where he spent 5 years as Horticultural Advisory Officer in the States of Guernsey's Advisory Service. He is now at the Ministry's Efford Experimental Horticulture Station, Lymington, Hants.

Dairy Cows on Slats

A second look at the slatted feeding platform installed for dairy cows at the University College of Wales a year ago. The initial experience was described by Mr. Lees in the June, 1961, issue of 'Agriculture'

J. L. LEES

OUR slatted feeding platform on the College Farm at Aberystwyth, was put in to save straw, to obviate daily cleaning out, and to avoid the disadvantages of a completely slatted lying area. Together with a straw bedding area, it is in the centre span of a 60 ft square Dutch barn. The outside spans are used for hay stored immediately in front of a Norwegian-type feed trough and for straw stored immediately behind the bedding area. In this way accommodation was provided last winter for 26–28 cows, giving approximately 42 sq. ft of strawed lying area, 16 sq. ft of slatted feeding area and 2 ft 4 in. of trough

space per beast. The steaming-up and freshly-calved cows in the herd remained tied in a cowshed which, since the introduction of a milking parlour in 1960, is no longer used for milking.

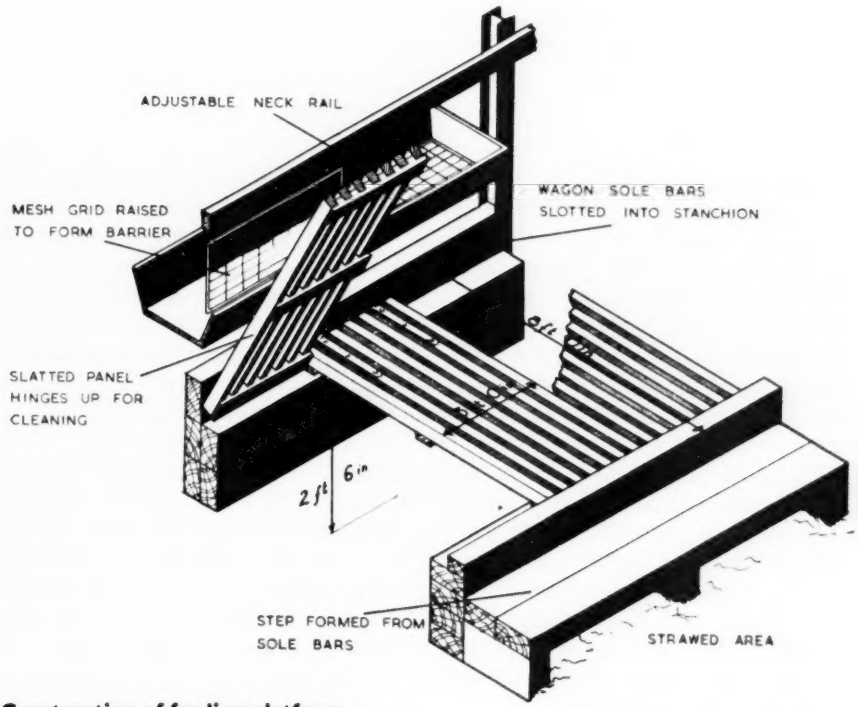
Saving in straw

General housing of the milking cows began on 10th November, 1961, and lasted, because of the long and difficult winter, until the 28th April—170 days. Straw consumption in that time amounted to 6 cwt per beast, a considerable saving over the amount commonly used in conventional loose-housing systems. At this level of consumption we can just remain self-sufficient for bedding straw. Without the slatted platform, we would have to buy about £70 worth of straw per winter. Since the platform cost £140 to install, the saving in straw which results from its use will pay for the cost of the slats in two years.

The real use of straw for litter has, in fact, been less than 6 cwt per cow per winter, because an appreciable amount of the litter being added freshly each day has been eaten by the cows (despite the fact that apparently they have been fed adequately)—though it has not been possible to measure the level of this consumption. Certainly, too, the cows in the loose yard have kept cleaner throughout the winter than those in our cowshed.

Little labour

Labour has been reduced to a minimum. Each day, whilst the cows are out in the yard or in the exercising paddock, three to four bales of straw are simply shaken out on the bedding area, and eight bales of hay are packed



Construction of feeding platform

The slats shown here are too narrow and the gaps too wide, causing the cows' hoofs to turn over

beneath the mesh grids of the feed trough. Both are ready to hand. There has been no need to give any attention at all to the slatted area itself, except during April, by which time the level of the bedded area had risen to the 2 ft 6 in. height of the feeding platform.

By the end of the winter the muck under the feeding platform had also risen in certain places to the underside of the slats, but it is clear that under our conditions removal of muck will be necessary only after the winter housing period is over. It can then be carried out at a time of our own choosing, if necessary waiting until stubble fields are available to receive it in September. Cleaning out is a simple matter, the slatted floor panels being raised on hinges to allow the entry of a tractor-mounted muck fork.

Cow comfort

All cows housed in this system were given access to their hay simultaneously. They lined up with very little fuss. The absence of bullying during feeding has been remarkable—possibly because all cows have much less confidence on slats than on other types of flooring. It is interesting to note that once they had finished their hay ration the cows returned at once to the bedded area. At no time during the total period of nine months in which the system has been in use has any animal been seen lying on the slats. Only very occasionally indeed has an odd one been found at night standing on the platform, and there can be no doubt at all that, given a free choice, cows will not stay on slats.

Once off the slats, cows first lie down along the timber walling at the rear of the bedded area. This is a good thing because they are then less likely to suffer damage, e.g., by treading from other cows; in fact, we have had no injuries at all so far. In this respect a relatively long and narrow building, such as ours, has the advantage of providing a greater number of 'protected' lying positions in relation to the total area available than would be possible along the rear of a square building. It also gives the maximum amount of trough space which, under our system, is the factor limiting the number of cows that can be housed.

There is just one point concerning the construction of the slats. If we were making them again, we would increase the width of each slat from 3 in. to at least 4 in. and reduce the gap between slats from 2 in. to $1\frac{1}{2}$ or even $1\frac{1}{4}$ in. The narrower gap would almost certainly be adequate to maintain the self-cleaning action of the floor because of the very concentrated shuffling which results from cows lined up shoulder-to-shoulder at feeding time. The shortcomings of the present slat and gap widths are clearly shown in the photograph opposite, where a certain amount of turning over of hoofs can be seen.

Watering points

Because of our hay-feeding system, it was considered particularly important to provide adequate watering points. At one time we thought of putting in a number of drinking bowls, possibly fixed to the steel stanchions of the barn at the front of the feeding platform. In the meantime, however, an ordinary concrete field water trough was placed at one end of the bedded area. Two things have surprised us this winter; first, that there has been extremely little extra contamination around this water trough, and secondly that, during the very cold spells this winter, it did not freeze up (possibly owing to the layer of warm dung which actually enclosed the lower parts of this trough). This is in extreme contrast to the great inconvenience caused by the freezing up of so many of the drinking bowls installed in other livestock accommodation on the farm. Coupled with the feeling that slow-flowing, low-pressure drinking bowls do not always encourage milking cows to drink sufficient water, we are now very much inclined to keep the existing water trough.

A great success

The general outcome of our experiences to date is that we are exceedingly pleased with the slatted floor feeding system, for it seems to have achieved very satisfactorily the three objectives for which it was installed—to save straw, reduce labour and avoid discomfort. And this it does in such a way that the capital cost, by the saving of straw alone, can be recovered in no more than two seasons.

It may even have a further possibility in providing a hay-drying platform from which the dried bales can be transferred to immediately adjacent storage.

Mr. J. L. Lees, B.Sc., is a lecturer in Animal Husbandry in the Department of Agriculture of the University College of Wales and is also Manager of the College Farm at Aberystwyth.

A Study in Farm Improvement

Two Farms into One

H. W. B. Luxton

By and large our farms are handicapped by obsolete, dilapidated and insufficient fixed equipment in relation to standards of stocking and labour efficiency which present-day economic conditions demand. The technical revolution in crop, grassland and animal husbandry has made heavier rates of stocking possible and the numbers of livestock are further increased, particularly on small and medium sized farms, by the use of purchased feed. These are important factors in the demand for increased building capacity on farms. In high rainfall areas and where drainage is impeded, good grassland management requires that the land must be carefully stocked and grazed. This again demands adequate buildings so that stock can be kept off the grass when conditions are too wet. In the interest of good labour economy the buildings should be well designed and carefully laid out.

Although the ideal set of buildings for any particular farm may be difficult to obtain, much progress has been made in building design and construction and there is a wide choice of structures to meet individual requirements. The problem is to make the best choice of buildings in relation to the requirements of the farming system and the financial resources.

Co-ordinated advice

When improvements are contemplated initial planning is of the utmost importance, and at this stage all the technical and economic advice available relating to the economy of the farming system generally and the implications of the proposed improvements should be obtained. In short, co-ordinated advice from the husbandry, farm management, estate management, building and economic specialists may well be necessary, and in the case of the tenant farmer close co-operation and consultation with the landlord.

Some farmers have been more successful than others in providing the right set-up to meet the needs of a progressive farming system. The problem is rarely one of replacing an old building with a more modern version; more often a drastic reorganization of the farming system is called for.

A farmer in South Devon was faced with the problem of farming two medium-sized farms, totalling some 320 acres and about three miles apart. Each had been run on a traditional mixed farming pattern with the usual

inadequate range of buildings. On neither farm was there sufficient accommodation for the size of the dairy herd required, and in any case considerations of labour economy precluded running the two farms separately as mixed dairy farms. How, it was asked, could a system of farming for the two farms be worked out which would allow reasonable labour efficiency?

New system worked out

It was decided in 1958 to concentrate the milking herd on one farm (mainly grass) and to use the other farm for corn production, sheep and young stock. The poultry enterprise (laying hens in batteries, and fattening turkeys) was to play an increasing part in the farm plan.

A key factor in the reorganization was the provision of a suitable range of dairy buildings on the dairy farm. A covered yard and Dutch barn for self-feed silage, with a double-tandem milking parlour, was decided on. An existing building was used for the milking parlour, but this turned out to be a doubtful economy. The figures in the table below give trends in cropping, stocking and financial results which have taken place following the reorganization.

CROPPING

Acres

	1956	1957	1958	1959	1960
Corn	33	55	59	70	67
Roots and green crops	41	8	3	10	19
Hay	70	55	33	53	32
Silage	45	58	54	67	64
Grazing	127	140	167	116	134
Buildings and roads	4	4	4	4	4
Total acres	320	320	320	320	320

STOCKING

Numbers

	1956	1957	1958	1959	1960
Cattle					
Bulls	2	1	1	2	2
Cows	69	72	54	61	60
Heifers in calf	22	—	—	3	—
Other cattle	69	73	66	49	61
Total cattle	162	146	121	115	123
Sheep					
Breeding ewes	39	35	79	158	153
Poultry					
Hens	600	720	1,530	1,800	1,980
Turkeys fattened	—	—	—	209	490

FINANCIAL RESULTS

Indices (1956-57 = 100)

	1956-57	1957-58	1958-59	1959-60	1960-61
**Gross output* (main items)					
†Crops	—	85	259	496	444
Cattle	100	96	149	83	57
Milk	100	105	98	82	82
Sheep	100	920	782	1,746	4,234
Poultry and eggs	100	107	124	128	173
All Items	100	108	120	109	122

continued on p. 232

continued	1956-57	1957-58	1958-59	1959-60	1960-61
Inputs (main items)					
Purchased feed	100	66	61	87	73
Seeds	100	118	258	70	133
Manures	100	116	105	136	147
Rental value and rates	100	101	114	116	133
Wages (Employees)	100	103	118	107	101
Power	100	91	105	115	107
Sundries	100	87	86	93	111
All Items	100	88	94	102	99
Net farm income	100	276	341	172	310
Management and investment income	100	298	373	175	338

*Gross output is sales less purchases adjusted for valuation changes.
†1955-56 = 100.

The main trends are an increase in the corn acreage, the produce of which is used mainly for feeding. Root and hay acreages have fallen, but silage has increased. The dairy enterprise is now a single herd of 60 cows, instead of two herds of 35 cows each, and the milking is carried out by one man. The small beef store enterprise has been given up and the ewe flock has been expanded. Up to the present the laying hens have been housed in buildings which were made redundant for food storage by the erection of the new dairy buildings. Turkeys have been fattened during the summer and autumn in accommodation vacated by the cattle. The progress of the poultry enterprise, however, has been such that specialized buildings are now being erected, and the poultry have made a considerable contribution to the farm economy.

Higher output; inputs unchanged

The benefits from reorganization are clearly illustrated by the financial results. Overall, gross output has risen by 22 per cent, sheep and poultry contributing largely to this increase, with a reduction in cattle and milk. These changes must, however, be considered in relation to inputs, which in total have remained virtually unchanged over the five-year period. This is in spite of generally rising prices. Although the poultry output has nearly doubled, the amount spent on purchased feed has fallen, mainly because of greater production of home-grown feed. Expenditure on manures has been increased, but a highly significant factor is that the wage bill was only 1 per cent higher in 1960 than in 1956. Wage rates have increased, but the labour force has been effectively reduced, and this smaller labour force has been able to raise the total gross output of the farm. The effect on income is highly satisfactory—an increase of more than 200 per cent over the 1956–57 level which in itself was not unsatisfactory.

This case is a good illustration of the enhanced results obtained from careful planning to amalgamate two medium-sized farms into a highly productive farming system. The attention given to the selection and provision of suitable farm buildings as part of the rationalization process has been a crucial factor, particularly in the labour economy. Total costs have been pegged, but at the same time gross output has risen, with the inevitable improvement in income.

Mr. H. W. B. Luxton, B.Sc.(Agric.), Dip. Agric. Econ. (Oxon.), is a Lecturer in Agricultural Economics in the University of Exeter and has worked for a number of years on farm management problems in the South-West.

Housewife and Butcher

UNA BISHOP

Of the housewife's many tasks, the feeding of her household is, perhaps, at once the most harassing and the most rewarding. Meal-times come round with relentless regularity, and spirits rise and fall remarkably with the contents and quality of the meals. For most housewives a contented family is a chief, if not *the* chief, objective, and many of us spend a lot of time planning menus which we think will satisfy and give pleasure. Breakfast and tea are fairly straightforward; it is lunches and dinners that offer the greater scope for variety and initiative, and it is generally the meat course around which the rest of the meal is planned.

The unique position which meat occupies in our diet is well demonstrated by the figures in the National Food Surveys. The most recently available (for 1961) shows that between a quarter and a third of total household expenditure goes on meat of one kind or another. In that year each of us in Great Britain consumed on average nearly 37 oz of meat and meat products per week, of which about half was carcass meat. The average weekly expenditure per person on all meats and meat products for home consumption was 8*s*. 8*d*. of which, again, approximately half went on carcass meats. The remainder was spent on cooked and tinned meats, poultry, bacon, sausages and the many other products now on the market. Over the past five years there has been a decline of some five per cent in household consumption of carcass meat—largely due to a reduction in beef supplies, but this has been more than offset by an increase in the consumption of other meats especially poultry meat. This trend is, therefore, of some concern to livestock producers, for demand is easier to hold than to recapture.

She knows what she likes

Few people think of their Sunday joint as part of an animal grazing in a field or looking over a gate. Most of us would find it distasteful to do so. In fact, I have known a Christmas dinner ruined for a whole family by one member thoughtlessly remarking 'Poor Jemima!', as one of the home-bred ducks was brought in steaming on a plate. The housewife fortunately does not need to bother about the living animal when she goes shopping for meat. All she has to do is to recognize 'good' meat—that is to say, the kind of meat her family likes. But though she probably does not realize it, she expects the livestock producer to think of his animals as meat. For how is he to produce what is required unless he understands what she means by 'good' meat and knows what kind of animals will produce it?

The livestock farmer and the butcher may privately disapprove of, or even deplore the housewife's choice of meat, but if they want to sell to the best advantage they have to accept it. Among the freedoms which we prize is the freedom to decide what we like to eat. We are open to suggestion and influence; we are not prepared to be told flat-footedly what we ought, or what we ought not, to like.

Does she know what she wants?

It would, nevertheless, be a mistake to think that every housewife goes to the butcher knowing exactly what she wants. In fact it does not pay to be too precise in one's ideas because the butcher may not be able to meet them. Most shoppers seem to have decided beforehand whether it is beef, lamb or veal they want; some have decided what cut they would prefer. But the final choice is usually made in the shop when a check has been made of what is available. The housewife's purse has to cover many foodstuffs and many other family needs; thus price is important.

Neither is a housewife's time unlimited; indeed, for many, the time factor may be even more limiting than the size of the purse. This is important in buying things that are as unstandardized as meat, because it means she cannot go from shop to shop. If she cannot find anything that pleases her in the first or second, she will probably change her mind and her menu. She may switch to poultry, canned meat or possibly fish.

The butcher sells what he's got

Of course, some housewives are better shoppers than others, just as some butchers are better than others. But even among the more expert shoppers, it seems to be accepted that 'good' meat has to be searched for. The experienced, intelligent butcher makes things easier for the housewife, but even he sometimes relapses into the wartime habit of telling her what she *ought* to like—or is it that he himself is in a dilemma because the farmer's idea of what he wants to produce and the housewife's demands do not match? He can, after all, only sell what he is able to buy.

What is it then, that the housewife is searching for at the butcher's when, she says she wants 'good' meat? It is always difficult to generalize about tastes, particularly where food is concerned. Moreover, any views set down here are based on discussions with only a limited number of people. What was of interest, however was the regularity with which the words 'tender' and 'lean' cropped up early on in all these discussions. Flavour was rarely

mentioned, and then only as a secondary consideration; although there does seem to be a general preference for home-produced meat, provided it is 'good' and 'not too dear'.

The present age of hurry allows little time for the pleasure of the gourmet, but home-produced meat usually seems to be associated in people's minds with 'more taste'. Perhaps the battle for tenderness and leanness leaves little energy for other attributes like flavour! Certainly many housewives seem to go home triumphant so long as they are confident that they have bought meat which will not lay them open to an accusation from their families that it is either tough or 'all fat'.

Price is no criterion of quality

What bliss it would be to go to the butcher, specify what one wanted (rather as one specifies the denier when buying nylons) and be sure of getting it. At present it is more often than not a question of persuading the butcher to bring out as many of the individual joints as you and he have the patience to examine, hoping that one will turn out to be right. It is no solution to ask for the most expensive. There is no guarantee that your idea of the best will square with the butcher's, unless you and he know each other well. Nothing is more exasperating than to pay a lot of money for a not-very-satisfactory piece of meat. I have yet to meet the housewife who resents the price of meat which is acclaimed by the family. Much of the discontent about prices comes from people who feel they have paid a first-class price for a second-class product. Indeed one of the most discouraging features at present is that there is so little difference in price between the various qualities of meat.

Housewives have to be Jacks (or Jills!)-of-all-trades and they need some help in judging meat and some confidence that they will get value for money. They want reliability in meat, just as they want reliability in branded products. I know many housewives who would be willing to pay more for a *guaranteed* top-quality product.

Other foods compete for the purse

A disappointment with carcass meat will quickly encourage housewives to turn to an alternative—perhaps chicken. Their purchases of poultry meat increased more than fourfold between 1956 and 1961, although the quantity bought last year was still comparatively small (about one-eighth that of carcass meat). For most of the years when supplies were building up to the present level poultry continued to command a higher price than carcass meat, although the disparity in price narrowed until, in 1961, that of poultry for the first time fell below that of carcass meat as a whole. Poultry is still looked upon as a bit of a luxury in many homes, and this helps to maintain the price. But the meat trade might well consider whether they have not something to learn from the organized selling and sales promotion undertaken by the broiler industry. With much to choose from, the housewife will always be influenced by those who push their produce and back their pushing by a reliable article.

Her voice should be heard

Although I am here looking at things from the housewife's point of view, I do not overlook the importance of the part she herself has to play if her family is to be given good meals. She can ruin the best of meat! Moreover it

is up to her to search for and press for good meat and to turn down the second-grade produce unless it is marked down to a reasonable price. But if she is going to put her energies into being a good shopper, she would like to be sure that her pressure reaches the producer and encourages him to take notice of her wishes. It is important to her, therefore, that the mechanism for paying subsidy should work with and not against the views she expresses through price.

A good meat meal demands efforts by the producer, the meat trade and the housewife. What the housewife quickly learns, however, is the wisdom of Mrs. Beeton's advice that 'however efficient and painstaking a cook may be, she can have little success if the ingredients she has to work with are of poor quality'. I think there would be less controversy about the price of meat if the housewife was satisfied that she would always get quality when she paid for it.

Horticulture and the Canary Islands

W. E. Shewell-Cooper

THE Canary Archipelago consists of seven largish islands of volcanic origin lying off the north-west coast of Africa, said to be a part of the lost continent of Atlantis. Fueteventua is in fact only 60 miles from the African coast, but this has a population of only some 17,000 or so, compared with about 500,000 in Grand Canary and 600,000 on Teneriffe. The islands are two Provinces of Spain.

The Grand Canary (591 sq. miles) is almost circular, the hills barren. If afforestation were carried out seriously, rain might be brought to the island. Teneriffe (795 sq. miles) is shaped rather like a shoe. It has more forests and is much greener than the Grand Canary, due apparently to the successful borings for water which have been made right in the centre of the mountains.

Three crops of tomatoes

All the Canary Island people I met were enthusiastic about the work that has been done for their agriculture by the British. We certainly introduced tomato growing, now a most important industry. Shipments to Southampton

Garachico, Teneriffe

arrive in about four days. The growing of these tomatoes in Gran Canaria is largely in the hands of five or six large landowners who not only own large acreages but rent what other areas they can. The workers are paid 480 pesetas a week (168 pesetas to the £1). For each kilo of tomatoes fit for export, they get 1·40 pesetas, but from this their weekly wage is deducted at the end of the season.

Stoner's Exhibition is the main variety, and each year large quantities of seed are bought from Stoners in Great Britain. The seed is sown in a seedbed in the open in May and June and the plants put out where they are to grow when they are a month old. The result is that heavy crops are obtained in October, November and December. The second season crop (as it is called) is grown in the Sardina zone. Here the seeds are sown in July and the harvesting done in January, February and March.

The third season crop comes from the area of Maspalomas and from San Nicholas on the west of the island. Here the tomatoes are harvested in March, April and May. In all cases the plants are grown in long lines 1 metre apart, 40 cm being allowed in the rows. Because many of the wells are near the sea, the water given to the tomatoes generally contains a certain percentage of salt, which I was assured is a first-class food for the plants. Salty water, on the other hand, is quite useless for bananas.

Bananas, potatoes and oranges

Two other important crops on the island of Gran Canaria are bananas and potatoes. The bananas are cut and sold each month, but only about 10 per cent of the total crop comes to England. It is possible to plant bananas in September one year and to be picking fruit the next. The potatoes are exported in boxes from February until May. The principal variety grown is

King Edward and the seed is bought regularly from England and Ireland. A yield of five times the weight planted is expected.

I was fascinated to see camels working, and I was told that these animals eat about the same quantity of food as a cow but do three times as much work as a mule!

The oranges (var. Washington Navel) on the island are particularly delicious, deriving their special flavour, it is said, from the volcanic soil.

Advice and education

I talked with Don Francisco Guerra, the Chief Agricultural Adviser for Gran Canaria, who has eight agricultural inspectors working under him. They work at the advisory bureau, dealing with soil analysis, advice on cropping, the quality of water, and the use of tractors. Statistical reports are sent to the Ministry of Agriculture in Madrid every ten days.

In the Agricultural School, just outside Las Palmas, the lecture rooms and laboratories are well equipped. The students pay no fees and are provided with a working uniform. Students younger than 18 are not accepted; many I spoke to were 27 or 28. There is a big demand for trained students, only half of whom are chosen to take the second year's course. They spend three hours in the classroom each day and five hours on the field, and they have to work all day on Saturdays.

Market garden at La Rocha

I went with Don Leopoldo Massieu, the Assistant Agricultural Adviser, to see his market garden at La Rocha. He has two acres under glass, much of which is plastic, and he invariably starts the season with a cucumber crop. The seeds are sown directly into the soil where they are to grow in September. French beans are put in at the same time as an inter-crop. The outside walls of the 'greenhouse' are made with bamboos lashed closely together. I saw pineapples growing in these houses satisfactorily, and what they called 'a late crop' of tomatoes. When I was there, towards the end of April, the plants were bearing very heavily indeed.

Large and small growers

The Conde de la Vega Grande de Guadalupe is a very large landowner in the Maspalomas district. He owns some 10,000 hectares. The only real plain on the island lies in this district, from which comes one-half of the total winter crop of tomatoes. The workers (some 500 men) are paid on the normal profit-sharing basis. Signor Franco, his Bailiff, is against the use of chemical fertilizers, holding that the vegetables grown from manure taste far better. The problem, however, lies in the purchase of straw for composting, which has to come from Andalusia, at a cost of 2·5 pesetas per kilo.

Sig. Juan Santana Padron of Marzagan is typical of many of the smaller market gardeners, owning only a quarter of an acre. This year he was able only to grow marrows, which he harvested early. When I was with him he was looking at the bare ground; it was impossible to plant anything else, because water was much too expensive to buy. Had he been able to get water, he might have produced four crops in the twelve months. The small men who are making a living are those who have 1 acre of bananas, which they can look after easily, producing 25 tons of good fruit, selling for say 125,000 pesetas.

Flowers and foliage plants, many of which are planted in the shade of the bananas, are likely to have a tremendous future—anthuriams, crotons sold as cut foliage, sanseverias, philodendrons and various types of orchids. As problems mount concerning the marketing of tomatoes because of increased production, more exotic flowers will undoubtedly be grown for export.

Teneriffe

The island of Teneriffe gives you the impression of being far more fertile than that of Grand Canary. The Chief Agricultural Organizer here, Don Jorge Menendez, is very much 'on his toes'. We climbed to 3,500 ft to see a wonderful apple farm. In between the apple trees hundreds of thousands of gladioli had been planted and over ten thousand bulbs of Watsonias. Tulips are also grown by the hundreds of thousands, and in between the tulips were growing godetias, so that no room at all should be wasted. American apple varieties, like Red Delicious and Yellow Delicious, are grown, as well as Calville Blanc. Many of the trees, trained as cordons parallel to the ground, are covered with polythene in April to protect the flowers from frost. Protection from wind is given by *Cupressus macrocarpus.*

The winter-bearing types of Avocado pear bring the highest returns. From 120 four-year-old trees one grower this year picked 5,000 kilos of good-sized fruit weighing ½ lb each. The trees crop so heavily that the branches have to be propped up.

It was amazing to see in La Fera a Strelitzia flower farm, with plants growing at 5,000 to the hectare. At 6 years of age these plants produce 30 Bird of Paradise flowers each. Huge Gerberas were also being grown, bearing 60 flowers a plant. These were the best I have seen anywhere in the world.

Flowers may have a great future

The great difference between Gran Canaria and Teneriffe is that the former is largely in the hands of the big men and the latter farmed largely by what one would call smallholders. Co-operative Packing Stations work very efficiently, for despatching both bananas and tomatoes.

The possibilities of the Canary Islands for flower growing is, to my mind, immense, especially if the flower growers can be organized in a similar manner to that of the banana and tomato growers. And this could be a very important consideration for the British market.

I should like to take this opportunity of saying how grateful I am to H.E. the Spanish Ambassador, who gave me introductions to the Governors of Gran Canaria and Teneriffe, and to thank these gentlemen and many others who were unstinting of their time and help.

W. E. Shewell-Cooper, M.B.E., N.D.H., who is Director of The International Horticultural Advisory Bureau, Arkley, Herts, visited the Canary Islands in April this year.

New Light on Farm Estates

Some points emerging from the A.L.S. enquiry

CONSIDERING the importance of the landlord-and-tenant system in this country, it is perhaps surprising that so little is known about the number, type, and size distribution of agricultural estates. Following an analysis of the results of this year's enquiry by the Agricultural Land Service into changes in farm rents, some useful light can now be thrown on the subject. Information was collected from a number of landowners and their agents in England and Wales, and their willing co-operation is gratefully acknowledged.

The enquiry was extensive, and it is thought that it covered a reasonable cross-section of all estates, although the larger ones may perhaps have been over-represented. It covered nearly 3 million acres, or rather more than a fifth of all tenanted farmland. There were 1,786 estates and 20,000 farms. In fact no rent enquiry since the National Farm Survey in 1941–43 has had such a wide coverage; that by Denman and Stewart in 1957 covered 12,660 holdings and nearly 2 million acres.*

Estate size

The first topic which the analysis throws light on is the distribution of estates by size. Is there such a thing as a typical size of estate? It would not seem so. About one-third of all the estates covered were in fact single farms averaging some 200 acres. Admittedly, they accounted for only 135,000 acres, or 4 per cent of the sample acreage, but clearly they are a significant element in the pattern of landownership.

The distribution by size of the remaining 1,163 estates, each comprising more than one farm, was as follows. It is shown that the large estates are certainly not typical in terms of numbers, although in terms of acreage they predominate.

*Denman, D. R. and Stewart, V. F. (1959). *Farm Rents*, Allen and Unwin.

Size range of estates (acres)	*Number of estates in sample*	*Acreage of estates in sample* ('000 acres)
0—1,000	541	240
1,001—2,000	241	357
2,001—4,000	207	584
4,001—6,000	79	390
6,001—10,000	54	429
Over 10,000	41	827
TOTAL	1,163	2,827

Number of farms on estates

Closely associated with the size of estate is the number of farms on estates. The following table shows how the number of farms per estate rises as estate size increases. On only 73 estates (4 per cent of the total) were there more than 50 farms.

Size range of estates (acres)	*Number of estates with*					*Total number of estates*
	One farm	*2—10 farms*	*11—50 farms*	*51—100 farms*	*Over 100 farms*	
0—1,000	610	492	48	1	—	1,151
1,001—2,000	13	156	84	1	—	254
2,001—4,000	—	52	146	5	4	207
4,001—10,000	—	5	100	24	4	133
Over 10,000	—	—	7	13	21	41
ALL ESTATES IN SAMPLE	623	705	385	44	29	1,786

Three kinds of estate

Three main types of estate stand out. First are the landowners with large estates. There were in the sample only 174 estates of more than 4,000 acres. It therefore seems unlikely that in England and Wales as a whole these large estates number more than a few hundred. They probably account, however, for about half of the total tenanted acreage, or for some 6 or 7 million acres. Then come the small and medium-sized estates, say up to 4,000 acres. There are probably some 4,000 of these in England and Wales, accounting for about 5 million acres. Finally, there are the single farms which are 'estates' only in the sense that the occupier is a tenant. How many of these exist in all cannot be estimated exactly, but the enquiry suggests that there may be some four or five thousand. These would account for the remaining $\frac{1}{2}$ to 1 million tenanted acres of farmland.

Next month's issue of 'Agriculture' will carry a complementary article on the information obtained from the survey on rent levels

The Ministry's Publications

Since the list published in the July, 1962, issue of *Agriculture* (p. 194) the following publications have been issued.

MAJOR PUBLICATIONS

Copies are obtainable from Government Bookshops (addresses on p. 254), from any Divisional Office of the Ministry or through any bookseller at the price quoted.

BULLETINS

No. 21. Domestic Preservation of Fruit and Vegetables (Revised) 5*s.* (by post 5*s.* 6*d.*)

The 10th edition incorporates results of the latest research work on the preservation of fruit and vegetables by Long Ashton Research Station. It is a valuable aid to teachers and students of domestic science.

No. 104. Cider Apple Production (Revised) 4*s.* 6*d.* (by post 4*s.* 11*d.*)

An up-to-date bulletin on cider orcharding entirely rewritten in the light of recent research and practice in cider apple growing and the requirements of the cider factory.

No. 138. Irrigation (Revised) 7*s.* (by post 7*s.* 6*d.*)

Deals with the need for controlled irrigation, water supply sources, equipment, planning of day-to-day irrigation and usage under glass, and on farm, fruit and vegetable crops.

No. 184. Squirrels, Their Biology and Control (New) 6*s.* (by post 6*s.* 5*d.*)

A monograph dealing extensively with the squirrel in Britain and describing research and trials carried out by the Ministry and the Forestry Commission in recent years. Liberally illustrated with black-and-white photographs and two colour plates.

LEAFLETS

Up to six single copies of Advisory leaflets may be obtained free on application to the Ministry (Publications), Ruskin Avenue, Kew, Richmond, Surrey. Copies beyond this limit must be purchased from Government Bookshops, price 3d. each (by post 6d.).

ADVISORY LEAFLETS

No. 10. Fruit Tree Red Spider Mite (Revised)

No. 208. The Starling (Revised)

No. 236. Commercial Horticulture: Advice to Beginners (Revised)

No. 432. Knotgrass and Allied Weeds (Revised)

No. 456. Bulb Scale Mite (Revised)

OTHER PUBLICATIONS

N.A.A.S. Quarterly Review No. 56. Summer 1962. (New) 2*s.* (by post 2*s.* 4*d.*)

Experimental Horticulture No. 6 (New) 7*s.* (by post 7*s.* 6*d.*)

Has been specially produced for the fruit grower and gives an account of practical experiments with strawberries, black currants and apples.

52. Central Westmorland

M. R. Dewings

THE county of Westmorland divides naturally into two, along a line from Kirkstone Pass through High Street and Shap Fells to the Lune Gap at Tebay. Dividing the county into three districts created quite a problem. This was resolved by making an upland district through the centre of the county, most of which is above the 600 ft contour. At no point is this district more than 10 miles wide, and at its narrowest this is reduced to 3 miles. From west to east, however, is a journey of over fifty miles, from Langdale Pikes or Helvellyn in the west to the head of Mallerstang dale in the heart of the Pennines. The western area, which forms part of the Lakeland National Park, has a natural scenic beauty which is well known. Its accessibility makes it popular with day trippers from the West Riding, Lancashire and the North East. For these, and the visitor who comes to stay, whether he travels on foot or by car, the popularity of the area is the main restriction on the enjoyment of its beauty.

North of Kendal lies the narrow part of the district, which broadens out again from Tebay on either side of the upper valley of the Lune and over the limestone escarpment of Ash Fell to the valleys of the upper Eden, running north, and the Rawthey, flowing south, to meet the Lune over the Yorkshire border at Sedbergh.

The eastern and western areas are quite different geologically. In the east there is the Pennine limestone, with glacial soil varying in depth from nil to a few feet, and rocky outcrops or scars. In the west, the rocks are Silurian shales and slates, weathered by ice and water. The surface is strewn with boulders, and only a few areas in the valleys have any depth of soil.

Writing after one of the longest winters within memory, it is easy to appreciate the extent to which the agriculture of the area is controlled by climatic conditions. Rainfall varies from over 80 inches in the Langdales to 40 inches in the east, and it is not at all unusual to have a rainfall of 12 to 15 inches in one month. Cattle have often to be housed from October onward, and this year there was hardly any growth of grass by the first of May.

The area of the district is 143,000 acres. Of these 48,000 acres are common grazings, 56,000 enclosed rough grazings and 39,000 crops and grass. Much of the latter includes fields with rocks above and below the surface which, in more favoured districts, would be classed as rough grazings. For this reason most of the district is in permanent grass, and the small area of tillage (1,600 acres) is used for the production of winter food. There has been an increase in silage-making but hay is still the main winter food. There are

550 holdings, of which 50 are under 15 acres and 250 over 100 acres of crops and grass.

As would be expected, sheep provide the greater part of the farming income. There are 100,000 breeding ewes, gimmers and rams. Except for a few cross-bred and draft ewes on some lower farms, these are of three hill breeds. On the poorest hills of the west is the hardiest breed in the British Isles—the Herdwicks. Moving east to slightly better conditions the Herdwick has been displaced by the Swaledale. North and east of Kendal is the local Rough Fell breed, while in the eastern Pennine area the Swaledales are again found in their native territory.

Milk production has increased steadily over the past twenty years, but the sale of store cattle and second and third calf cows is still an important source of income.

Changes come slowly in this type of district, not so much because there is no desire for change but because of the difficulties and problems involved. That changes must come is only too clear, as the district is likely to be for some time one of the problem areas of farming.

There are 300 holdings with less than 100 acres of crops and grass. Of these, 100 have benefited under the Small Farmer's Scheme. The effect has been to put the young man on his feet and in most cases to give him hope of improvement. For most of the others its effect has been counter-balanced by reduction in prices for products, and it has done little more than help them maintain their standard of living.

Livestock products, milk, store cattle and sheep will continue to be the main sources of income. Reductions in the price of milk and a considerable fall in the market value of dairy replacements has resulted in an increase in Ayrshire and Friesian breeds at the expense of the traditional Shorthorn.

Milk production costs are high, owing to the long winter and shortage of spring grass. This is particularly the case on farms where there are hill sheep flocks, many of which come off the hill in February and do not return after lambing until mid-May. In spite of this most farms still rely on the monthly milk cheque. Suckler cows have replaced dairy stock on some farms, but the limited number that can be carried on the small farm, and the fact that the Hill Cow and Calf Subsidies represent almost all the profit, makes it a doubtful proposition.

Hill sheep have been showing a reasonable return. The lambing crop varies more according to the type of fell than the breed of ewe and ranges from 70 per cent in some parishes to 100 per cent in others. Nearly all gimmer hoggs are retained to maintain the flock. The limited area of in-bye makes it necessary to winter these away. This wintering is becoming increasingly difficult to get, even at a cost of 35*s*. to 40*s*. a head.

There are no industries in the district, except for a little slate quarrying for the production of Westmorland green slate.

The number of farms in the county has been reduced by one-quarter since 1920 and, though it may be regretted, this trend must continue if a satisfactory standard of living is to be maintained for those who are left. A prosperous countryside must be a source of satisfaction to all concerned and greater attraction to the visitor. The income accrued from the Lakeland holidaymaker is playing no small part in maintaining the standard of living on many of these upland holdings.

H. HOLLINRAKE
Agricultural Land Service, Cambridge

Housing those Pigs!

A FARMER with existing pig houses in which conditions are not ideal by modern standards often regrets that he cannot provide the most up-to-date buildings. It could well be, however, than he is in a better position than the farmer who has to start from scratch or has to provide a part of his enterprise with new premises. Much can be done to improve existing houses, and conversions are not generally so expensive as new work. There is no doubt that the profitability of pig keeping shows a very narrow margin when high capital costs have to be written off.

If alterations to existing houses are to be worth while, it is essential that the buildings are basically sound to start with. To spend money on unsound structures will, in the end, be more costly than building new. The main fault of many houses is a lack of warm, stable, climatic conditions. More particularly this applies to farrowing houses, where, although not more than 60°F is ideal for general background temperature in the house, the creep should be capable of maintaining temperatures of 75 to 80°F. Most pig-keepers now use infra-red lamps, but far too many do not provide a lid to the creep. Without this the hot air rises and cold air replaces it at floor level; this causes draughts, which are detrimental to the young pigs.

It is not easy to maintain a background temperature of 60°F in a farrowing house because of the low heat output from the pigs in relation to the volume of the house. This means that, as temperatures inside will fluctuate with those outside, in very cold weather the house temperature can fall to freezing point where no insulation has been provided. Whilst house temperatures below 60°F can be accepted on occasions, provided there are good warm creeps, continual low temperatures are unsuitable. It is, therefore, essential to conserve warmth.

This problem of suitable temperature equally affects weaners, baconers and heavyweights. Temperatures of 65 to 75°F are recommended for pigs up to about 120 lb weight. Thereafter, lower temperatures are acceptable, falling eventually to between 55 and 65°F for heavy hogs. Even at the lower figures, however, some form of insulation is necessary, and this should be the first matter to receive attention after making sure that the basic structure is sound.

Whether insulation shall be permanent or temporary depends largely on the eventual life of the building. Supposing it to be worth doing well, either a ceiling, or a lining to the underside of the rafter with compressed asbestos sheet supporting 2 in. of glass wool, would give a permanent job. A more temporary method would be supporting a ceiling on heavy gauge wire

netting, covering with polythene sheet, and using 2 in. glass wool laid on top. To reduce cost still further, straw could take the place of the glass wool. A depth of 10 in. of chopped straw would give an approximate equivalent in thermal value, but there may be added problems if the straw becomes verminous or a rat run. Nevertheless, where straw is readily available, more use might be made of it to provide low capital cost insulation. Whereas an even temperature throughout a house might be the ideal, a low straw-covered ceiling would go a long way towards providing suitable conditions. Housing cannot be considered in isolation, however, and where strain of stock, feeding and management are good, housing which is not quite up to the best standards can be outweighed by other factors, particularly in view of the savings in capital investment.

Ventilation is necessary to complete the control of climatic conditions, and here there has, perhaps, been too much of a swing towards the mechanical fan. Mechanical ventilation certainly gives absolute control, but for the man with a small piggery, converted, say, from an old stable and holding less than 100 pigs, simple outlets and inlets, intelligently controlled, will give reasonable results—again not perfection, but a saving on costs. Many pig keepers consider poor ventilation to be the main reason for pigs not doing well. It may be; but if natural ventilation is bad, it is usually because of a lack of insulation! Until there begins to be a marked difference in temperature between inside and outside, natural displacement of air cannot take place.

The layout of the pens must next be considered. Here again, existing conditions will dictate planning. Subject to the rules of good husbandry, the more pigs that can be accommodated the better, as capital and labour charges have a wider spread, and at high stocking rates, climatic control is easier. The aim should be 6 sq. ft per pig at bacon weight, 8 sq. ft at heavy hog weight and $4\frac{1}{2}$ sq. ft at pork weight. There are some commonly occurring faults that prevent such stocking rates. With trough feeding, there is often a lack of trough space in relation to the pen area available. The answer is to turn to floor feeding. Meal feeding on the floor is not recommended because of dust problems, and pelleted food costs more, but there is both experimental evidence and limited farm experience to show that the extra cost of pellets is recovered in better conversion rates and reduced wastage of food. Trough space is often lost by having gates in the pen fronts. It is worth considering whether such gates are really needed. If access can be gained elsewhere a further two pigs per pen might be possible.

A feeding passage takes up valuable space. In converting a narrow building for pigs, it might make the difference between getting in pens on two sides or on one side only. Why not elevate the passage over the pens and form a boarded walk by cantilevering over a common centre wall? Clearly, floor feeding would best suit such an arrangement.

In arable areas the use of straw in forming deep-littered and warm yards—possiby under the cover of a simple Dutch barn—can produce good results for the pig's finishing stages. This applies particularly to the heavy hog, as the use of self-feeders saves permanent troughing. Such an arrangement may not be ideal, but it can be improvised without laying out capital on a single-purpose building and at a great deal less cost.

The thing that matters in any enterprise is the profit at the end. If methods are used which do not always measure up to text-book standards, what matter if the return is commensurate with the effort and capital expended?

Agricultural Chemicals Approval Scheme

Additions to the 1962 List of Approved Products

THE following additional products have been approved under the Agricultural Chemicals Approval Scheme. The Second List of Approved Products was published on 1st February, 1962.

INSECTICIDES

PHOSPHAMIDON

A systemic organo-phophorus compound for the control of codling moth, apple sawfly, pear sucker, aphids and red spider mites on apples, pears and hops, and for aphid and mangold fly control on sugar beet.

Liquid Formulations

Dimecron—May and Baker Ltd.

HERBICIDES

DINOSEB (DNBP)—*Formulations in Oil*

Chafer's DNBP Haulm Killer—J. W. Chafer Ltd.

MISCELLANEOUS

DAZOMET

A soil sterilant for the control of potato root eelworm, certain soil-borne diseases and weed seedlings.

Dusts for Incorporation in Soil

Boots Soil Sterilizer—Boots Pure Drug Co. Ltd.

CORRECTION

Agricultural Chemicals Approval Scheme (*June, 1962, issue, p. 145*).

Under PARAQUAT, in the Herbicides Section, the description should read:

A translocated herbicide for the control of tufted grasses and those with short rhizome systems, and many annual broad-leaved weeds. Permits direct re-seeding of old grass swards without ploughing. Also for controlling weeds around top and soft fruit and for pre-emergence weed control, especially where grass weeds are a problem.

IN BRIEF

Coypu and Mink

Orders under the Destructive Imported Animals Act, 1932, have been approved by the Agriculture Ministers to control coypu and mink in Britain. This has been done to reinforce the Government's decision that further steps should be taken to deal with coypu and mink at large, in view of their threat to agriculture, drainage and fresh-water fisheries. Occupiers will be required to notify the presence of coypu or mink at large on their land. Licences will be necessary to keep these animals and reasonable precautions will have to be taken to guard against escapes. The Orders, will be in force for five years.

A new drive against coypu is being launched in East Anglia. As an exceptional measure, for a period of two to three years, extra staff are being engaged by the Department to help with the systematic clearance of the main area of infestation in co-operation with rabbit clearance societies, river boards and drainage authorities. It is hoped that the present activities of rabbit clearance societies will continue and traps will be supplied according to their requirements. Although the Agriculture Act, 1947, and the new Orders give Ministers powers of enforcement, it is hoped that occupiers, in their own interests, will ensure by voluntary co-operation that this campaign is a success.

Coypus were introduced into Britain about 1930, and by 1939 were being bred on some forty fur farms. (Coypu fur is known as 'nutria'). A few of these farms remain, but coypus which escaped from them bred to such an extent that they have now become well established in Norfolk and Suffolk. At first they did little but good, by eating aquatic vegetation. By 1960, however, farmers and river boards were complaining about the considerable damage they caused to river banks and to crops, particularly sugar beet.

To meet this situation, rabbit clearance societies in the eastern counties were authorized to carry out control measures and were allowed to claim the 50 per cent Government grant on approved expenditure. Twenty-three societies have been actively co-operating with river boards in control measures. Approximately 100,000 coypus have been destroyed under these arrangements and many others have been accounted for by individual farmers and landowners.

But the present rate of destruction is not reducing numbers fast enough. A disturbing feature has been that colonization by coypus is spreading in East Anglia, and there is concern about the difficulty of locating and destroying these small pockets which, if not controlled, would very quickly increase in size and cause serious infestation.

Coypu are unlikely to be exterminated, but there is a good prospect that, in about two or three years' time, they will be greatly reduced in numbers and contained within a few isolated areas.

Mink were first farmed in Britain in 1929 and have become more popular since the second world war. There are about 600 known fur farms in Britain, mainly in England, with about 20 in Wales and some 70 in Scotland. Unofficial estimates suggest that there are over 80,000 adult mink on British fur farms producing some 160,000 young in a year.

Mink have sometimes escaped from farms and have killed poultry and damaged fisheries, principally in Hampshire but also in the south-west of England, Kent, Lancashire and Pembrokeshire. Losses to agriculture have not so far caused undue

concern, but contrary to expectations there is now evidence that mink are breeding in the wild—on the Hampshire Avon, in Devon on the river Teign, and on the river Teifi on the borders of Carmarthenshire and Cardiganshire. If left undisturbed these local pockets of mink could grow into sizeable populations.

Wild mink can be caught in box-traps of the type used for grey squirrels, with fish or meat as bait. It is also possible for them to be caught in traps set in tunnels.

Cereal Seed Dressings and Wild Life

Following the voluntary restriction in the use of certain cereal seed dressings, there has been a very marked reduction in the number of bird deaths caused by toxic seed dressings this year. The same line will be followed this autumn and for the spring, 1963, sowing season.

Under these restrictions cereal seed dressings containing aldrin, dieldrin and heptachlor should not be used at all for spring-sown grain, and they should only be used for dressing autumn-sown wheat where there is real danger of attack from wheat bulb fly.

Bulk Milk Collection

The Milk Marketing Board started its pilot bulk milk collection scheme in England some years ago. There are now thirty schemes and the number is increasing rapidly as more producers come to realize the advantages which bulk collection offers. A free booklet, just issued by the M.M.B., explains the value of the scheme and emphasizes the important part which producers can play by their co-operation.

To quote the booklet, 'This technique replaces the churn method of milk collection. It is ideally suited for a perishable product like milk because the milk is kept at a low temperature throughout. A refrigerated farm tank, which also acts as a measuring vessel, cools the milk and holds it at a temperature of 40°F until the collection vehicle arrives. The tanker driver first examines the milk and measures its quantity by a dipstick. Next the milk in the tank is thoroughly mixed by a mechanical agitator and a sample is taken for testing at the dairy.

'The milk is then drawn from the tank into the insulated road tanker, and finally before leaving the farm, the driver rinses the tank interior with water. On its journey by tanker to the dairy the milk is kept at the same low temperature as in the farm tank. Thus it moves from the farm to its destination under ideal conditions.

'The bulking and refrigeration of milk under the old churn method are functions usually performed by the buyer. In bulk collections, however, these operations are carried out by the producer. The latter has to incur capital and operating costs previously carried by the buyer.

'To cover this new situation, an additional payment is paid to the producer for bulk milk. The money for this payment comes from a premium paid by the buyer, together with savings in transport costs. Bulk collection can thus be made self-supporting.'

Avoiding Stream Pollution

With the subject of stream pollution by farmyard sewage brought to the fore by two recent Acts of Parliament, a leaflet issued by the Department of Scientific and Industrial Research will be of interest to many farmers. It is recommended that strong liquors (and, where possible, washings) should be irrigated on land. This is perhaps the best method of disposal in country areas but it is not suitable in every case.

Irrigation may be by field pipes, open furrows, or sprays. A recent development reported to be used in Scotland and elsewhere, involves spray disposal of a mixture of dung, urine, and washings by rain guns on to grassland. This method, says the D.S.I.R., would seem to merit wider consideration. Some farmers report success from storing mixtures of washings and water in a reservoir, and using the mixture,

later, for irrigation. The local River Board can give advice on the dilution and size of pond necessary to avoid nuisance.

The use of soakaways involves a risk that underground water may be contaminated, and before adopting this method the local water authority should be consulted. For a soakaway to be effective, the soil must of course be porous; even so, clogging often occurs after a time.

Fowl Pest: Change of Government Policy

As from 1st April, 1963, the policy of compulsory slaughter with Government compensation, will, except for the rare per-acute form of the disease, be discontinued in England and Wales. This decision follows consideration by the Minister of the Report of Sir Arnold Plant's Committee, published earlier this year. Since there is now no likelihood of eradication by the present slaughter policy, the Government are unable to continue to bear the cost of compensation, which is now running at a rate of up to £10 million a year.

Instead, with the full agreement of the industry, a policy of vaccination with a dead vaccine against Fowl Pest will be pursued, and for a period of two years the price of the vaccine will be subsidized. It will cost the farmer about ½*d.* per dose.

In Scotland the present slaughter policy will continue, and vaccination will be allowed but not subsidized. As a result of the new policy, there will be virtually no further compensation after the end of this financial year, except in Scotland, and the charge on the Exchequer for vaccination should be less than £1 million a year for two further years, at the end of which it will cease.

Weekly Agricultural Market Report

Some readers of *Agriculture* may not be familiar with the weekly Agricultural Market Report, which is issued by the Statistics Division of the Ministry. This document contains the following price tables in respect of England and Wales:

Part I. Agricultural Section

1. Cereals—average prices to growers, as indicated in returns made by merchants under the Corn Returns Act, 1882.
2. Port market prices of grains and feedingstuffs.
3. Hay and straw—prices received by farmers in representative areas.
4. Potatoes—average prices at growers' markets.
5. Fatstock
6. Store and breeding stock } numbers and average prices at selected markets
7. Eggs and poultry—prices at certain wholesale markets.
8. Farmhouse butter, duck eggs and table poultry—prices at certain country markets.

Part II. Horticultural Section

A. Fruit (including citrus fruit and bananas), vegetables and flowers; average wholesale prices in England and Wales.

B. Average wholesale prices of fruit and vegetables at nine individual markets.

The annual subscription charge, including postage, for the complete report is £3 5*s.* for 51 issues, but separate sections can be supplied at lower rates. Further details and free specimen copies of the report are obtainable on request to the Price Statistics Section of the Ministry at Great Westminster House, Horseferry Road, London, S.W.1.

Books

The Economics of Subsidizing Agriculture. GAVIN MCCRONE. Allen and Unwin. 25*s*.

Many economists shake their heads over the methods and results of Government assistance to agriculture. Some believe or suspect that subsidies encourage resources to stay in the industry that ought to be diverted to exporting industries or that exports would benefit if more food was imported from the country's customers. Others complain that the Exchequer payments to agriculture are not exclusively devoted to measures which directly improve its efficiency and its ability to do without continuing subsidies.

Mr. McCrone's intention in this book is to marshal the economic arguments for and against the principle of supporting agriculture and to analyse such evidence as he can bring to bear on those arguments. He also makes a detailed survey of the historical development of British agriculture and, in the light of the evolutionary trends which affect the position of agriculture in the economy, examines critically the methods now used to support the industry.

The biggest sections of the book are devoted to an analysis of the contribution made by agriculture to the balance of payments in the past, and the possible need for such a contribution in the future. The author rates the past contribution very low, since he finds that home production pre-empted resources that could have been used to stimulate investment, growth and exports; yet it did little to displace dollar imports, led to an increase in imports of dollar feedingstuffs and had the effect of hurting Sterling Area producers, who therefore bought fewer British exports.

Chapter 6 contains the only argument acknowledged by the author which might have provided an economic justification for agricultural expansion. This is when he deals at some length with the proposition, based on tariff theory, that import saving could, in certain circumstances, be more beneficial than export promotion. But he finds that the calculations needed to substantiate this proposition are too speculative to permit any definite conclusion to be reached, and he declares it to be interesting but unproven.

Summing up, for an industry which he thinks could reasonably be maintained at its present size, the author prescribes lower costs, realistic prices and freedom in this environment to choose what it will produce.

This book is written mainly in the exclusive language of the economist, and its style and lengthiness of treatment betray the conventions of academic thesis-writing. Though the author does not claim to be an agriculturist, he does venture what are perhaps some rather shallow judgments on agricultural matters, while even in the economic analysis his conclusions do not always appear to spring exclusively from the evidence presented. But it is undoubtedly a gain to have so much of the stuff of the chief agricultural controversies assembled and analysed in a book of this quality.

J.A.E.

Report and Proceedings of the Sixteenth Oxford Farming Conference.

The Oxford Farming Conference is nothing if not topical, and the Sixteenth Conference was no exception. Items dealt with included marketing, co-operatives, buying and selling groups, farm business management and planning—everything, it might appear, except husbandry!

The absence of husbandry topics is not, however, out of keeping with the impression one has of this Conference—that it is more often ahead of farming practice than abreast of it. What is the point of good husbandry—important though it is—if the enterprise is losing money, or is not so profitable as another equally acceptable enterprise? Similarly, good husbandry will not solve our difficulties if the resultant produce is not profitably marketed.

The Conference had ample evidence that the N.A.A.S. is gearing itself to accept the challenge of business analysis. A new, quick method was described for the analysis of farm accounts and for determining the comparative profitability of different enterprises. Farmers may often feel some difficulty in providing the N.A.A.S. with the necessary basic details for this exercise, particularly as regards food allocation. We were reminded that feed alone can account for two-thirds of production costs of some commodities. The point made about the part that farm business analysis can play in lowering production costs, without increasing output, was a topical one which would find favour in many places.

These, then, were some of the issues which made up the theme of the 1962 Conference.

All the papers and discussions are printed in full in the Report.

The Oxford Farming Conference is perhaps the most accurate barometer of leading farming thought in this country. Points of view are freely expressed and debated. The industry, in fact, submits *itself* unashamedly to analysis. If you were unable to attend, you should certainly read the Report. It is excellent value for money. Copies may be obtained from M. H. R. Soper, Department of Agriculture, Oxford University, Parks Road, Oxford—7*s*. (post free).

T.W.

Plants, Viruses and Insects. KATHERINE ESAU. Harvard University Press. London: Oxford University Press. 30*s*.

This is an expanded and revised version of the John M. Prather Lectures in Biology given by the author at Harvard University in 1960. The title of the slim volume is rather misleading, because Professor Esau has confined herself very largely to discussing the anatomy of the conducting tissues of flowering plants and its relationship to the translocation of solutes and the feeding of 'sucking' insects. Viruses are dealt with almost as an afterthought, perhaps as a justification for the inclusion of some pictures of sectioned tissues of virus-infected plants.

The text is very readable and is liberally interspersed with anecdotes, but the actual amount of information provided is not great. Problems involving the transport of fluids through vessels are essentially physical and fluid engineering problems, and an audience which is interested in such matters will not learn a great deal from these lectures. Though we are told in several places that transport by diffusion is inadequate to explain translocation, nowhere is the simple theoretical basis for diffusion formulated, nor is there any account of the implications of fluid flow through small capillary tubes.

These concepts would be easily grasped by a student audience and would serve to prevent muddled thought. As, for example, existed in another case touched upon by Professor Esau, where entomologists were not aware that the anatomy of the mouth-parts of aphids was such that they were precluded from active feeding for purely physical reasons.

The book is beautifully produced and well illustrated, and will serve as an interesting introduction to the anatomy and physiology of the vascular tissues of plants. But readers expecting to learn much about viruses will be sadly disappointed.

R.M.

The Potato Crop: Policy and Practices. J. D. SYKES and J. B. HARDAKER. Wye Agricultural College. 5*s*.

A survey of the English potato industry, well supported by tables and charts, starts this report, covering in some detail average yields, total supplies coming on to the market, price fluctuations and financial returns to the grower.

In all these aspects a considerable seasonal variation is displayed. Against this, personal consumption is 'inelastic'—a word much favoured by the authors—for people do not eat more potatoes in times of surplus and low prices or curtail consumption when prices are high. In consequence, growers receive their highest returns when crops are small (£87·1 m. for 5,030,000 tons in 1957) and least when yields are high (£60 m. for 6,455,000 tons in 1960). As personal incomes rise, consumption of potatoes tends to fall, and estimates of consumption are quoted of about 150 lb per head by 1980 compared with 300 lb per head in 1880.

The second section of the report examines husbandry practices which are likely to affect costs or returns, and provides a useful introduction to the economic approach to the potato crop for growers who have no previous acquaintance with this subject. Costings from a survey of 137 Kentish potato crops in 1958 and 1959 are used to illustrate the wide range in inputs, output and financial returns. The histogram of the seasonal labour requirements proved incomprehensible to me: better proof-reading might have clarified both this and the discrepant evaluations of farmyard manure on pp. 47 and 48.

It is concluded that potato growers face considerable change. Increasing yields, coupled with decreasing consumption, are likely to lead in 20 years to an acreage reduction of 200,000, while 20,000 farmers will cease to grow potatoes. The acreage quota system now used by the Potato Marketing Board is thought to be inadequate for its purpose and to have an undesirable effect of slowing down the rate of change. The authors recommend the Board to examine critically its role in the changing situation and to consider regulation of the crop on a tonnage rather than an an acreage basis.

The end of the 1961/62 potato season is an opportune time for such thoughts, even though the authors may regret that this year's statistics could not be included in the report. Copies are obtainable from the College.

F.E.S.

Irrigation in Great Britain. H.M.S.O. 5*s.* 6*d.*

This is a report of the Study Group on Irrigation set up under the Committee on Agriculture of the Natural Resources (Technical) Committee. It is indicative of the increasing importance of irrigation that this is the third report published this year by H.M. Stationery Office which has dealt with this subject.

Both the farmer and the adviser will find a great deal of value and interest in this report, which deals with most aspects of irrigation as carried on in this country today, indicates the gaps in our present knowledge of the subject and accordingly makes recommendations for further re-rearch.

The extent and the current uses of irrigation are summarized. In this country some 130,000 acres are irrigated per year, and this acreage is increasing by nearly 12 per cent each year. It could be that the amount of irrigation carried on will be doubled in the next ten years. The maps which are included show that south-east of a line drawn from Hull to Torquay there is a need for irrigation in five out of every ten years, which increases to nine out of ten years around the Thames basin.

The need to irrigate on a strictly scientific basis is emphasized if maximum economic advantage is to be obtained, i.e., there must be knowledge of the soil water conditions within the root range of the crop. Moreover, it is desirable to have additional data relating to soil moisture deficiency and to soil moisture tension. The amount and the timing of irrigation are also explained with reference to such factors as stage of growth, current moisture deficit, and soil texture and structure. Mention is made of the main crops that can benefit from irrigation. Warning is given that irrigation can sometimes have disadvantages, e.g., where potato blight exists it will spread more rapidly with irrigation, and strawberries, if excessively irrigated, will have an increased risk of loss from Botrytis rot.

The various forms of irrigation are examined—sub-surface, surface (by flood or by furrow) and overhead (spray-lines, sprinklers and rain-guns). Reference is made to the use of irrigation as a protection against frost and in combination with fertilizer and manure spreading. The ways of increasing water supplies for irrigation are enumerated, including farm storage reservoirs.

An important chapter deals with costs. About £3 m. has been invested; some £$\frac{3}{4}$ m. is being added each year, while total running costs are of the order of £$\frac{1}{2}$ m. a year. With 'free' water, capital costs average about £25 an acre, annual depreciation is estimated at 25*s.* and running costs at 20*s.* an acre-inch, i.e., total annual costs are about 45*s.* an acre-inch. However, the data collected from the samples show a very wide range in costs.

At the end of most chapters there are useful bibliographies.

G.W.F.

The Farmer in the Mechanical Age. E. LEYLAND. Edmund Ward. 9*s.* 6*d.*

From its very first sentence this book will appeal to young people. It gives a comprehensive picture of the many branches of farming, with special emphasis on the mechanical side. The text is simple, and explains modern economic and scientific principles in an unobtrusive and interesting manner.

The author takes the young reader through the round of the year, describing the farmer's problems, season by season, showing how he deals with his land, crops and stock, and outlining the construction and use of most of the machines and implements he has to help him.

There are, however, certain defects; some of the phraseology is poor. For instance: 'Pupils are taught ordinary school subjects and agriculture as well, plus horticulture too'. Certain statements are wide of the mark, such as, 'This same combine will harvest almost anything. It can be used for beans, peas, beet, clover, mustard and oats, as well as for almost a hundred other crops'. The word 'beet' should surely be qualified, and are there 'almost a hundred other crops'?

Enthusiasm should not be allowed to outrun its more retiring brother, accuracy, especially when addressing the young. And what is one to think of the main farmer-character in this book who attributes Sinding's *Rustle of Spring* to Debussy!

A.S.

The Emergence of Larvae from Cysts in the Genus *Heterodera*. AUDREY M. SHEPHERD. Tech. Comm. No. 32, Commonwealth Agricultural Bureau of Helminthology. 20*s.*

This is a well-written, well-organized, easy-to-read review of the literature on this subject. It is one on which a great deal of work has been done in the last 30 years or so, but recently the pace has quickened. Although research has been spasmodic, the literature is considerable and diffuse, and

Dr. Shepherd is to be congratulated on her authoritative and orderly treatment, which enables the uneven pattern of research to be seen for what it is.

There are seventeen sections, beginning with a list of the species now recognized in the genus, and an introduction. The remainder includes: 'Structure and morphology of cysts', 'Techniques', 'Maturation', 'The cyst as a unit', 'Stimulation of hatching' and 'The chemistry of hatching factors in root diffusates'. Moisture, aeration, temperature, season, light, hydrogen ion concentration irradiation, and decay and parasitism of cyst contents all receive their share of attention; practical aspects are also considered. Numerous graphs appear in the text.

The work ends with a table setting out the hatching responses of *Heterodera* spp. to root diffusates from many sources, followed by another summary covering the biological responses of cysts to water hatch, effect of dessication, dormancy, hatching responses in root diffusate, artificial hatching agents and substances found inactive as hatching agents. The bibliography contains over 300 references.

The book will be invaluable to the research worker as a source of reference and as an appraisal of the amount of work done on the various aspects of hatching. It will also be of interest to any who have to deal with plant and soil nematodes.

J.B.G.

Dairy Facts and Figures, 1962. MILK MARKETING BOARD.

To every farmer who has anything to do with milk, to advisers, and not least to students, this handbook is worth its weight in butterfat. Every conceivable set of figures seems to have been thought of, and the 'Milestones in Milk Marketing' from 1917 is a quick guide to dairying legislation. The book is free on request to the Milk Marketing Board, Thames Ditton, Surrey.

E.D.

ACKNOWLEDGMENT OF PHOTOGRAPHS

We gratefully acknowledge permission to use the following photographs:

p. 205. *Farmer and Stockbreeder;* p. 208. *Farmers Weekly;* pp. 212 and 213. M. B. Rutherford; p. 222. E. A. Wheadon; p. 224. Guernsey Horticultural Advisory Service; p. 228. University College of Wales; p. 230. H. W. B. Luxton; p. 233. *Meat Trades Journal;* p. 237. Spanish National Tourist Office.

Printed in England under the authority of HER MAJESTY'S STATIONERY OFFICE
by Hull Printers Limited, Willerby, Hull, Yorks.

(K76) 72-1-62-8

Regular monthly tests for solids begin in two months' time.
Upon these will be based the bonuses or penalties of the following year.

Next year's bonus is earned now!

Steaming-up

It's a pity there is so much lip service to steaming-up and so little positive action, since a planned programme of steaming-up not only produces higher quality milk but actually costs less than makeshift methods.

Dry off the cows at least six weeks before calving and let them have the best grass the farm affords—don't turn them out on poor grazing to fend for themselves. Feed a complete and balanced dairy cake to give them every opportunity of repairing the wear and tear of previous lactations and of renewing their tissues for the next.

Although in the natural order of things the solids content falls as the cow ages, the science of nutrition can help to direct and control nature. If you have any doubts on that score get hold of the Silcock handbook on steaming-up, apply the recommendations conscientiously and compare the results—both in quantity as well as quality—with those from the same cows last year. You will be delighted. You will also be relieved of anxiety on the score of quality next autumn !

SILCOCKS
PROVEN
HIGH YIELD LOW-COST
PLAN

SILCOCKS

R. Silcock & Sons Ltd., Stanley Hall, Liverpool 3

OFFICIAL APPOINTMENTS

UNIVERSITY OF NEW ENGLAND

Australia

DEMONSTRATOR IN AGRONOMY

Applications are invited for an appointment as Demonstrator in the Department of Agronomy. The successful applicant will be expected to demonstrate and assist with laboratory classes in Agronomy, Soil Science, and Plant Physiology, and also with field work. Applicants should possess (or expect to complete in 1962) a degree in Science, Agricultural Science or Rural Science and will be expected to study for a higher degree.

Salary will be determined according to qualifications and experience within one of the following grades: Grade I £A1,120 × 60 — £A1,360; Grade II £A1,320 × 80 — £A1,560; Grade III £A1,560 × 80 — £A1,720. These figures do not include the current cost of living adjustment of £A44 per annum. Tuition fees will be remitted to enable the person appointed to proceed to a higher degree.

Applications close on *30 September, 1962*, and should include details of qualifications and experience, personal information, a recent photograph and the names of two people to whom reference may be made on the applicant's behalf. Applicants from the United Kingdom, South Africa and Canada should forward an additional copy of their application to the Secretary of the Association of Universities of the British Commonwealth, Marlborough House, Pall Mall, London, S.W.1., by the same date.

T. C. LAMBLE
Registrar
University of New England, Armidale, New South Wales, Australia.

UNIVERSITY OF ADELAIDE

READER IN CELL STRUCTURE

Applications are invited for the above-mentioned appointment in the Department of Agricultural Chemistry at the Waite Agricultural Research Institute.

SALARY SCALE: £A3,000-100-3,300, with superannuation on the F.S.S.U. basis. The initial salary may be fixed within the scale in accordance with qualifications and experience.

GENERAL CONDITIONS OF APPOINTMENT and a statement about the post may be had on application to the Registrar of the University or to the Secretary, Association of Universities of the British Commonwealth (Branch Office), Marlborough House, Pall Mall, London, S.W.1. Any further information desired will gladly be supplied on application to the Registrar. Potential candidates in the United Kingdom are invited to get in touch with Professor R. K. Morton, Waite Professor of Agricultural Chemistry, whose present address is C/— Department of Agricultural Science, University of Nottingham, Sutton Bonington, Loughborough, Leicestershire.

APPLICATIONS, in duplicate and giving the information listed in the final paragraph of the general conditions of appointment, should be lodged with the Registrar, University of Adelaide, Adelaide, South Australia, *not later than 15 September, 1962.*

OFFICIAL APPOINTMENTS

NIGERIA

Applications are invited from suitably qualified candidates for the following Contract appointments in the Public Service of the Government of Northern Nigeria.

1. **SPECIALIST OFFICER**—Ref. NR. 707
(Botany and Plant Pathology)

Qualification: Honours degree followed by two years' post-graduate training in Botany and Plant Pathology.

Duties: General plant pathology investigations.

Salary: £972 per annum to £2,046 per annum gross, entry point depending on years of experience. £100 or £150 per annum Gratuity and Free Passages to and from Nigeria.

2. **HYDROLOGICAL SURVEYOR**—Ref. NR.676

Qualification: A Diploma from a recognized University or School of Technology, which must include surveying, with at least two years' experience on Hydrological projects.

Duties: Ground survey and hydrological work on river investigations.

Salary: £972 per annum to £1,716 per annum gross, entry point according to experience. £100 or £150 per annum Gratuity and Free Passages to and from Nigeria.

3. **SENIOR AGRICULTURAL ENGINEER**—Ref. NR. 679

Qualification: B.Sc. Agricultural Engineering involving a four year course in general agricultural engineering OR A.M.I. Mech. E. with agricultural experience OR A.M.I.C.E. with mechanical bias including agricultural experience. Candidate should have appropriate experience of agricultural machinery and equipment, and practical experience in soil conservation work would be desirable.

Duties: The duties are of a general nature pertaining to Land Use and Development; survey; soil conservation projects; erection and maintenance of agricultural implements, machinery and buildings on Agricultural Stations or projects.

Salary: £1,944 per annum to £2,568 per annum gross, entry point according to experience. £150 Gratuity and Free Passages to and from Nigeria.

4. **AGRICULTURAL SUPERINTENDENT**—Ref. NR. 730
(Mechanical)

Qualification: Ordinary National Certificate or City and Guilds Certificate OR Three years' apprenticeship in a Mechanical Engineering Works and experience in repairs and maintenance of diesel and petrol engines, agricultural tractors and implements.

Duties: Supervision of field operation of equipment and major workshops, organizing ploughing schemes and repair services.

Salary: £906 per annum to £1,926 per annum gross, entry point according to experience. £100 or £150 per annum Gratuity and Free Passages to and from Nigeria.

5. **FISHERIES OFFICER**—Ref. NR. 360

Qualification: Applicant must have a degree in Biology with emphasis on Zoology including, preferably, some work on fish and/or satisfactory completion of appropriate sections of Colonial Office Fisheries Officers' Course. A working knowledge of the French language would be desirable.

NIGERIA—*continued*

Duties: To execute plans for:
(i) Rational development of river fisheries.
(ii) Demonstration and organization of peasant fish culture.

Salary: £972 per annum to £2,046 per annum gross, entry point depending on qualifications and experience. £100 or £150 per annum Gratuity and Free Passages to and from Nigeria.

6. **HYDROLOGICAL ENGINEER**—Ref. NR. 725

Qualification: A Degree or Diploma from a recognized University or Technical College which exempts the holder from Parts A and B of the Institute of Civil Engineers' examination, with at least two years' experience on Hydrological work or a post-graduate course in Hydrological work.

Duties: To carry out Hydrological work in Northern Nigeria under the direction of the Deputy Chief Hydrological Engineer.

Salary: According to experience in the range of £1,440 per annum to £2,202 per annum gross plus £150 per annum Gratuity and Free Passages to and from Nigeria.

Write, stating brief details of age, qualifications and experience quoting appropriate reference to:

The Recruitment Secretary,
Northern Region Recruiting Agency,
Nigeria House,
9 Northumberland Avenue, London, W.C.2.

or Telephone TRAfalgar 1244; Extension 145.